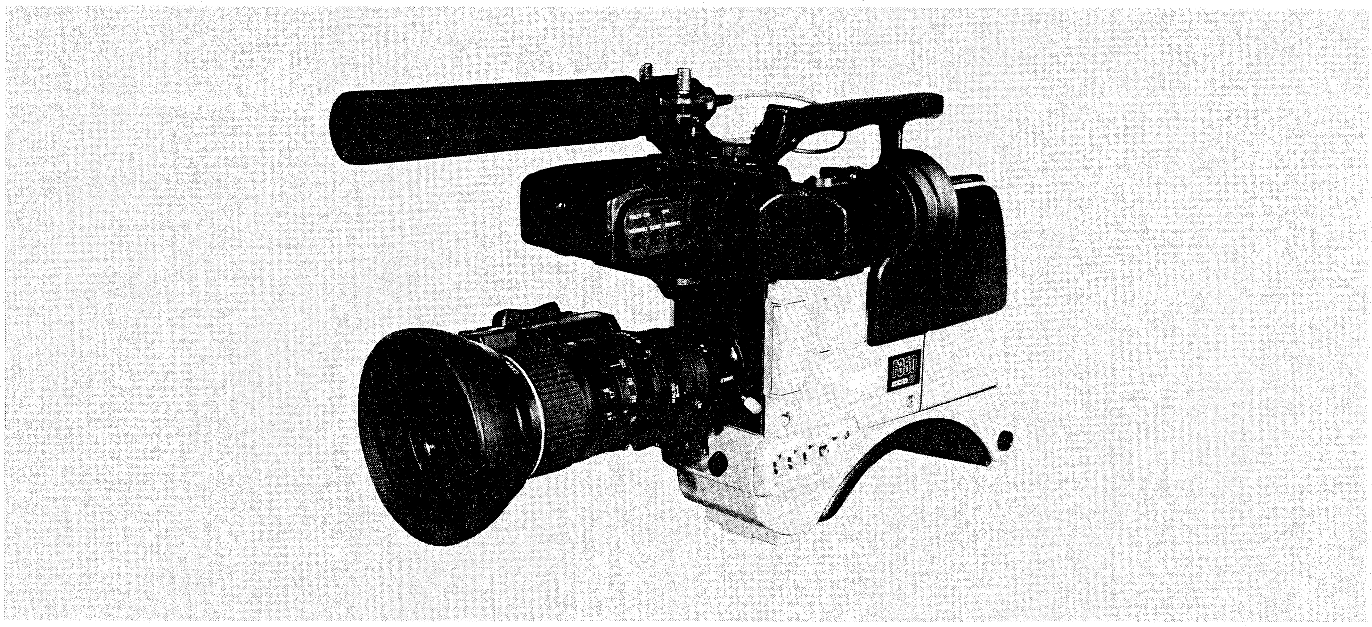
ORDER NO. AVS9009382C8

Service Manual

PAL Colour Video Camera

WV-F350E Series



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Panasonic

Service Manual

PAL Colour Video Camera

WV-F350E Series

Vol. 1

Circuit Description

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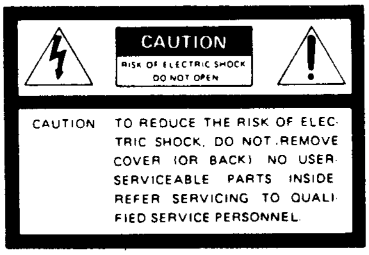
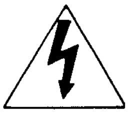


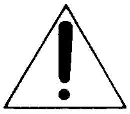
CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK) NO USER-SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns the user that uninsulated voltage within the unit may have suificient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

SPECIFICATIONS

ENG Colour Camera WV-F350E

Pick-up System: Middle index prism system (F1.4)
Image Sensor: Three 1/2" frame-interline transfer (FIT) CCDs
Pixels: 716 (Horizontal) x 582 (Vertical)
Scanning Standard: 625 lines, 50 fields, 25 frames
Synchronizing System: Internal or external (gen-lock), automatically switchable
Internal: PAL standard
External (gen-lock) Input: PAL composite (VBS) signal or black burst signal
Subcarrier Phase for Gen-lock: Freely adjustable over 360°
Horizontal Phase for Gen-lock: Adjustable from -0.1 μsec to $+3.5$ μsec.
Video Output Five ouputs
1.0 Vp-p PAL composite/75 ohms x 2 (BNC connector)
Y/C (S-VIDEO) Output:
  1.0 Vp-p Luminance (Y) composite/75 ohms x 1 (S-VIDEO connector)
  0.3 Vp-p burst level chrominance/75 ohms x 1 (S-VIDEO connector)
1.0 Vp-p PAL composite/75 ohms × 1 (32-pin VTR/RCU connector)
(PAL composite, Y/C component switchable)
PAL: 1.0 Vp-p PAL composite/75 ohms × 1 (32-pin VTR/RCU connector)
Y/C: 1.0 Vp-p luminance (Y) composite/75 ohms × 1 (32-pin VTR/RCU connector)
  0.3 Vp-p burst level chrominance/75 ohms × 1 (32-pin VTR/RCU connector)
(R/G/B, Y/PB (B-Y)/PR (R·Y), Y/C/B switchable)
R/G/B: 0.7 Vp-p/75 ohms × 1 each
Y/PB/PR: Y: 1.0Vp-p (Sync: 0.3V)/75 ohms X 1
  PB/PR: 0.525Vp-p/75 ohms (at EBU colour bar) x 1 each
Y/C/B: Y: 1.0 Vp-p (Sync: 0.3V)/75 ohms × 1
  C: 0.3 Vp-p burst level chrominance/75 ohms × 1
  B: 0.7 Vp-p/75 ohms × 1
Auxiliary Input: 1.0 Vp-p composite/75 ohms through 32-pin VTR/RCU connector
Audio Input: MIC: -70 dBm × 1 (XLR connector)
Audio Output: -20 dBm or -60 dBm/unbalanced, switchable (32-pin VTR/RCU connector)
Illumination Required: 2000 lux at F4.0, 3200°K
Minimum Illumination: 30 lux at F1.4 with +18 dB gain, more than 70% output level
Signal-to-noise Ratio: 59 dB (typical, luminance) without gamma and aperture correction
Horizontal Resolution (at center): 700 lines (Y signal)
Registration: 0.05% (entire picture area, excluding lens)
Detail/Aperture: Horizontal and vertical (2-line type)
White Balance: Automatic white balance setting (AWC with two memories) and Manual white balance
Black Balance: Automatic with pulse canceller
Encoder: Y,U,V
Colour Bar: Built-in EBU colour bar generator
Electronic Shutter: 1/120 sec, 1/250 sec, 1/500 sec, 1/1000 sec, 1/2000 sec
Colour Conversion Filters: 3200°K, 5600°K with 12.5% ND, 5600°K, Close
Maximum Cable Length: VTR Cable: 30 m (no power supply via cable)
  10 m (power supply through cable)
32-pin Studio Cable: Max. 300 m

Switches:
Camera Power, Colour Bar/−6 dB/Camera Selection, High Gain Selection, White Balance Selection, Auto White/Auto Black Set, Level Indicator/Zone, VTR Start/Stop, Check, Lens Iris Selection, Detail Level Selection, Detail Band Selection, Subcarrier Phase Coarse, Recording Time Reset
Camera Adaptor: VTR Compatibility, Audio Level Selection, Audio Monitor Selection, VTR Video Output Selection, Power Select, RCU/VTR Signal Selection
Viewfinder Tally ON/OFF
Zoom Lens PH15X7BKRS2 Servo/Manual Zoom Selection, Servo Zoom Control, Iris Control Selection, Auto Iris, Return Video, Macro, VTR Start/Stop

Controls:
Camera Total Pedestal, Red Gain, Blue Gain, Subcarrier Phase Fine, Horizontal Phase, Lens Iris
Camera Adaptor Audio Monitor/Intercom Level
Viewfinder Brightness, Contrast

Standard Lens PH15X7BKRS2:	15:1 auto iris servo control zoom lens, 7.5 –105 mm with macro mode, F1.4	
Lens Iris:	Automatic or manual	
Lens Mount:	Bayonet mount for 1/2" pickup device	
Lens Filter Size:	72 mm P = 0.75	
Viewfinder:	1.5" (1-3/8" actual image size) electronic viewfinder with character display, safety Zone, Date/Time and zebra level indicator	
Power Source:	12 V DC, 5 sources as follows: (1) Battery Pack (2) AC Adaptor (3) External DC source through 4-pin DC connector (4) VTR (external AC adaptor) (5) Remote Control Unit through VTR/RCU connector	
Battery Pack Operating Time:	Approximately 1 hour with WV-PS60E Approximately 2 hours with WV-PS33E	
Power Consumption:	Camera Head	15.6 watts (12 V DC, 1.3 A)
	ENG Configuration	18 watts (12 V DC, 1.5 A)
	Studio Configuration	27.6 watts (12 V DC, 2.3 A)
Ambient Operating Temperature:	–5°C — +45°C	
Ambient Operating Humidity:	30 % — 90 %	
Dimensions:	Camera Head Only (WV-F350HE)	146(W) X 262(H) X 170(D) mm
	ENG Configuration (with WV-BA72)	240(W) X 300(H) X 560(D) mm
	Studio Configuration	183(W) X 475(H) X 615(D) mm
Weight:	Camera Head only	2.5 kg
	ENG Configuration	7.6 kg
	Studio Configuration	9.6 kg

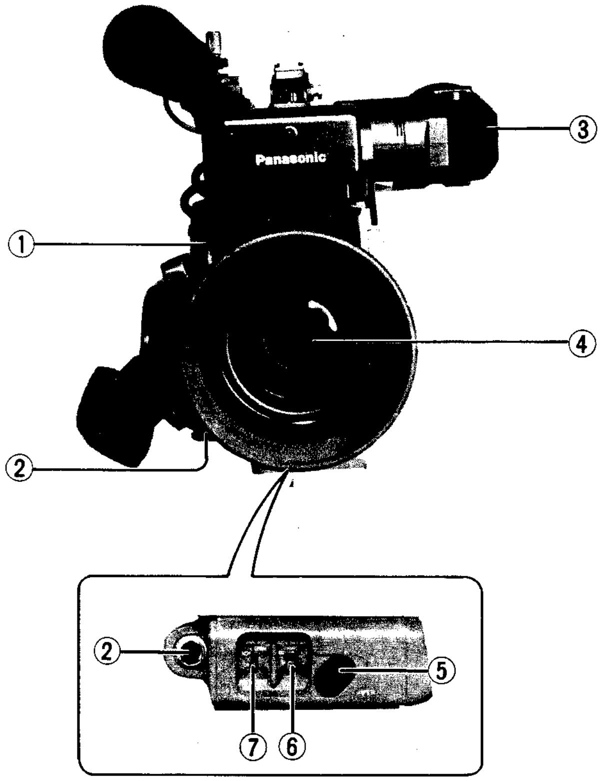
Dimensions and weights are approximate.
Specifications are subject to change without notice.

SYSTEM ACCESSORIES

- COLOUR CAMERA WV-F350DE
  - Camera Head WV-F350HE .... 1 set
  - 1.5" Electronic Viewfinder WV-VF39E ... 1 set
  - 15X Servo Control Zoom Lens PH15X7BKRS2 .... 1 set
  - Microphone WV-MC35 .... 1 set
  - Tripod Mounting Adaptor WV-QT70 .... 1 set
  - Dockable Kit WV-DKT70ME .... 1 set
  - Carrying Case WV-CC71AE .... 1 set
- COLOUR CAMERA WV-F350E
  - Camera Head WV-F350HE .... 1 set
  - Camera Adaptor WV-AD250E .... 1 set
  - 1.5" Electronic Viewfinder WV-VF39E .. 1 set
  - 15X Servo Control Zoom Lens PH15X7BKRS2 .... 1 set
  - Microphone WV-MC35 .... 1 set
  - Tripod Mounting Adaptor WV-QT70 .... 1 set
- COLOUR CAMERA HEAD WV-F350HE
  - Camera Head WV-F350HE .... 1 set
- MAIN OPTIONAL ACCESSORIES
  - 1.5" Electronic Viewfinder WV-VF39E
  - 5" Electronic Viewfinder WV-VF65BE
  - Remote Control Unit (RCU) WV-RC36
  - Unidirectional Electret Condenser Microphone WV-MC35
  - 15X Servo Control Zoom Lens PH15X7BKRS2
  - Lens Control Kit WV-LK35E
  - Tripod Mounting Adaptor WV-QT70
  - 2/3" Bayonet Mount Adaptor WV-LC25E
  - AC Adaptor/Charger WV-PS31
  - Battery Pack (1.65 Ah) WV-PS60E
  - Battery Pack (3.5 Ah) WV-PS33E
  - Battery Charger DE-1232 (for WV-PS60E)
  - Battery Charger WV-BC30 (for WV-PS33E)
  - Battery Adaptor WV-BA71 (for AU-BP402)
  - Battery Adaptor WV-BA72 (for AU-BP220)
  - MII Format VTR Adaptor WV-VT15E
  - β - cam Format Adaptor WV-VT16E
  - Carrying Case WV-CC71AE
  - Battery Adaptor WV-AD19
- OTHER OPTIONAL ACCESSORIES
  - VTR Cable: WV-CA32/10 (32P-10P) ...... 3 m (10 ft)
    WV-CA32A/14 (32P-14P) .... 3 m (10 ft)
    WV-CA32A/26 (32P-26P) .... 3 m (10 ft)
  - 10-pin VTR Extension Cable:
    10H-30AS .... 10 m (30 ft)
    10H-50AS .... 17 m (50 ft)
  - 14-pin VTR Extension Cable:
    WV-CA14X30 .... 10 m (30 ft)
  - Studio Cable: 32A-25 .... 8 m (25 ft)
    32A-50 .... 17 m (50 ft)
    32A-100 .... 30 m (100 ft)
  - S-VHS Cable: WV-CA38
  - Lens Connector Conversion Cable WV-LC10

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

ENG Colour Camera System, WV-F350E Series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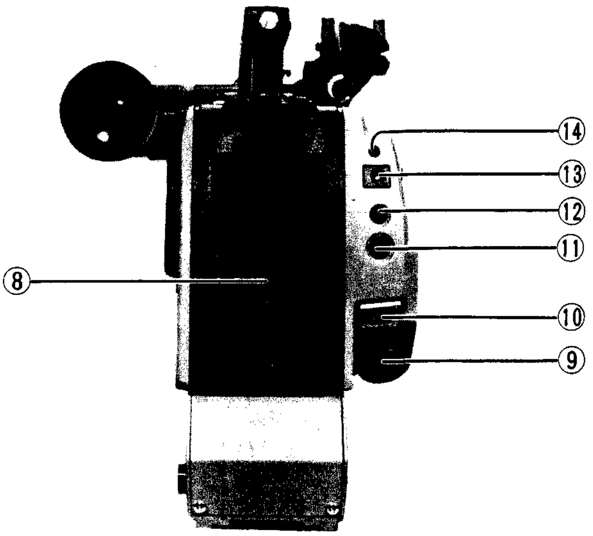

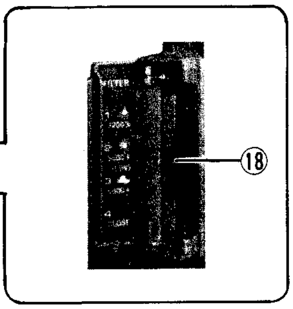

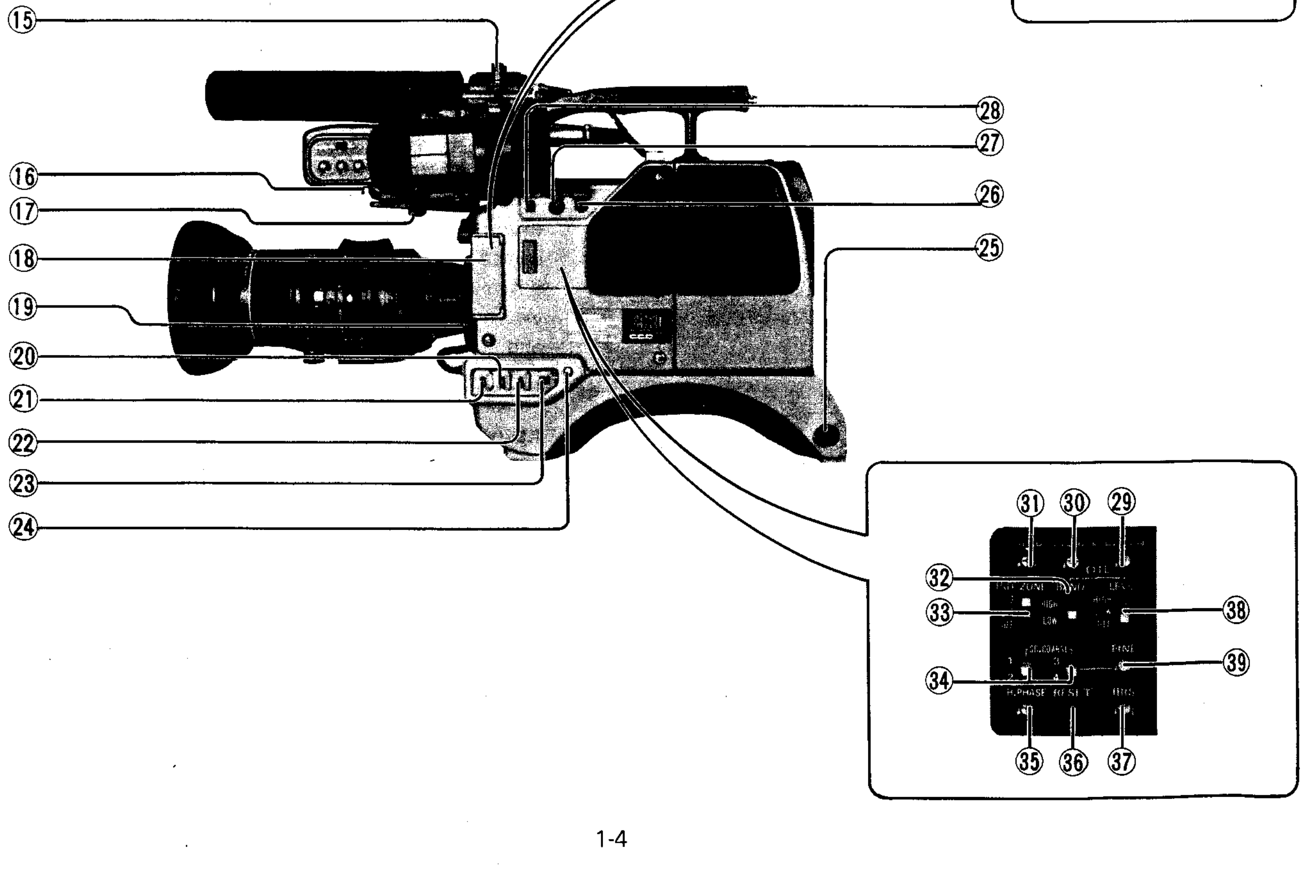
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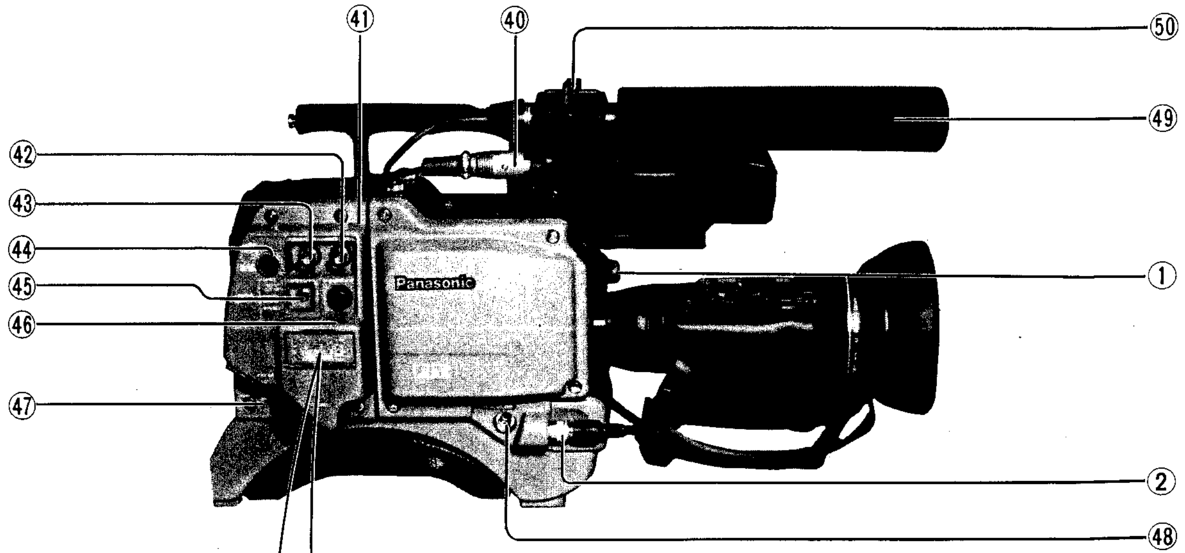
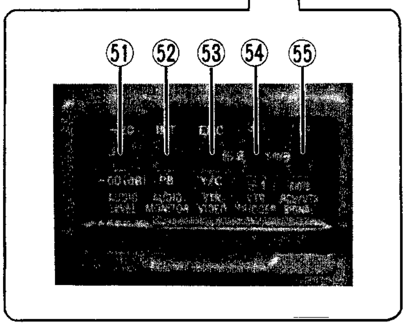
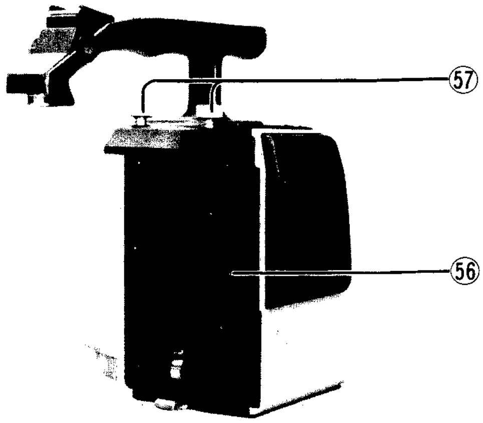






1. **Viewfinder Connector (12-pin) (VIEWFINDER)**
   Connect the viewfinder cable from the 1.5" or 5" Electronic Viewfinder to this connector.
   Note: When connecting the 5" Electronic Viewfinder WV-VF65B to this connector, use the Viewfinder Conversion Cable supplied with the WV-VF65B. Refer to page 33 for details.

2. **Lens Connector (12-pin) (LENS)**
   Connect the lens cable to this connector.
   Note: If the Auto Iris Servo Control Zoom Lens with an 8-pin connector is to be used, the optional Lens Connector Conversion Cable WV-LC10 is required. This will allow proper matching of the 8-pin connector of the lens with the 12-pin connector of the camera.

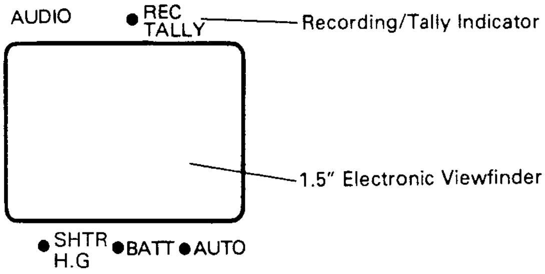
3. **1.5" Electronic Viewfinder**
   This small 1.5" (1-3/8" actual image size) monitor shows exactly the image picked up by the lens. The viewfinder can be tilted 90° from horizontal and it is adjustable up and down by approximately 13/16" (20 mm). Further, the viewfinder may be slid laterally by up to 1-3/4" (45 mm) and 13/16" (20 mm) back and forth.

4. **Auto Iris Servo Control Zoom Lens**
   This is a high-quality 7.5 – 105 mm lens offering automatic as well as manual iris control and servo control zoom. The lens features a bayonet mount and F1.4 maximum aperture. Picture size may be magnified by up to 15 times through use fo the zoom feature. Simply rotate the macro ring for close-up or wide angle recording. Macro shooting is possible of objects up to 10 mm (1-15/16") from the lens surface.
   Refer to page 16 for details.

5. VTR Start/Stop Button (VTR) (parallel operation)

This button is used to change the recorder mode from pause (Recording Pause) to recording and functions in the same way as the VTR Start/Stop Button (86) on the lens. Press once to start recording.

While recording, the Tally indicator in the viewfinder lights and the Tally Light (61) on the viewfinder also lights.



When the button is pressed once more, the recorder is set to the Pause mode (Recording Pause), and the Recording/Tally indicator and Tally Light will go off.

Note: If the attached zoom lens features a lock-release type VTR start/stop button, this VTR Start/Stop button functions only when the corresponding button on the lens is released.

6. Auto White/Auto Black Set Switch (AUTO W/B BAL AWC/HOLD/ABC)

This switch sets the white balance and black balance automatically as follows:

AWC: This position is used for setting the white balance when the White Balance Selection Switch ⑳ is set to the AWC A or AWC B position. White balance adjustment is required when "AWC A NG" or "AWC B NG" starts blinking in the viewfinder or when the Auto Warning Indicator in the viewfinder lights.
Two white balance settings for two light sources, such as indoor and outdoor, can be retained in the memory. In this case both the AWC A and AWC B positions are used.

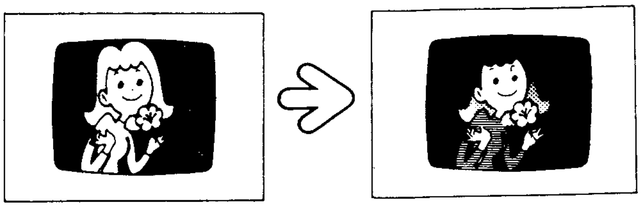
HOLD: In this position, the white and black balances set at the AWC or ABC position can be held fixed if so desired for at least one year.

ABC: This position is used for setting the black balance. Black balance adjustment is required when "ABC NG" starts blinking in the viewfinder or when the Auto Warning Indicator in the viewfinder lights.

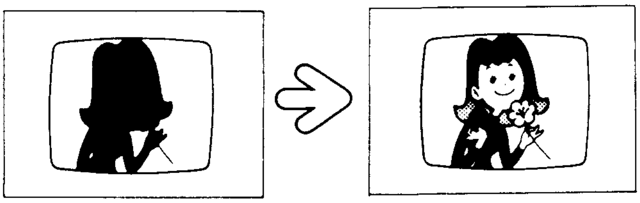
Note: Since the black balance adjustment always is performed automatically first at 0 dB gain and then at +18 dB gain, the picture will flash in the viewfinder while the black balance is being set. This flashing will help inform you of present adjustment, so as not to confuse the image with a high gain setting of the High Gain selection switch (0 dB or 18 dB).

7. Lens Iris Selection Switch (LENS IRIS; 1/2 OPEN/NOR/1/2 CLOSE)

This switch can be used to set the lens iris opening to compensate for unusual lighting conditions. If the object is brightly lit against a dark background, set this switch to the 1/2 CLOSE position. This will close the lens iris by a 1/2 F-stop.



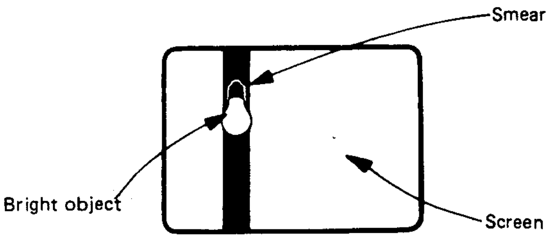
If the object is relatively dark and the background is bright, set the switch to the 1/2 OPEN position. This will open the lens iris by a 1/2 F-stop.



At the normal (NOR) position, the lens is operating with normal lens iris openings.

Note:

1) If this switch is used, be sure to return it to the detent NOR position after use.
2) If the camera is aimed at an extremely bright object, such as the sun or a lamp, vertical bars (i.e. smear) may appear in the picture. This is a peculiar phenomenon of the CCD and is quite normal. Try as much as possible to avoid shooting scenes with extremely bright light, as this could also be harmful to the camera.



3) Set this switch to the NOR position when the camera is used together with the Remote Control Unit (RCU).
4) If a zoom lens with an 8-pin connector is used, the Lens Connector Conversion Cable WV-LC10 must also be used.

8. Battery Pack Mounting Angle

Mount the Battery Pack WV-PS60E/WV-PS33E or the AC Adaptor/Charger WV-PS31 on the camera by sliding it down along this mounting angle.

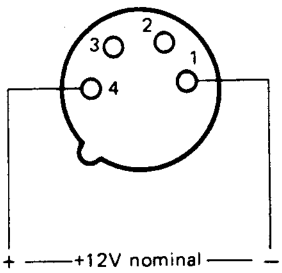
9. VTR/RCU Connector (32-pin) (VTR/RCU)

When using the camera together with a Panasonic portable colour VTR, the specified VTR cable should be connected between the camera and VTR. This connector is also used for connection of the 32-pin studio cable from the Remote Control Unit (RCU) for comprehensive system operation. When connecting the 32-pin studio cable to this connector, the camera is automatically set to the RCU operation mode.

- 1/2"VHS and 3/4" U-vision portable VTR (10-pin)
  - WV-CA32/10 (32P-10P cable)
- 3/4" U-vision portable VTR (14-pin)
  - WV-CA32A/14 (32P-14P cable)
- MII portable VTR (26-pin)
  - WV-CA32A/26 (32P-26P cable)

10. External DC Input Connector (XLR, 4-pin) (EXT DC)

This connector accepts the power cable from an external DC source supplying nominal power of 12V, 2A (a belt type battery or car battery for example). This connector also accepts the power cable from an AC adaptor. For driving the studio configuration, a 12 V DC, 2.5 A power source is required.



11. Intercom Jack (M6) (INTERCOM)

This jack is used for communication between the camera operator and operators of the RCU and Special Effect Generator in the system.

12. Audio Monitor Jack (M3) (AUDIO MONITOR)

When an earphone is connected, the sound picked up through the microphone ㊾ or played back audio on the 3/4" U-vision recorder connected to the camera through the 14-pin camera connector can be monitored. Selection of the audio source is enabled by the Audio Monitor Selection switch (52).

13. Battery Connector (BATTERY)

Connect the cord from the Battery Pack to this connector.

14. Recording/Tally Indicator (red) (REC TALLY)

This indicator lights when the camera is set to the recording mode (through the VTR Start/Stop button), and informs the person concerned of scenes being recorded.

The Tally indicator also lights when the camera is in full system operation together with the Remote Control Unit and Special Effects Generator.

In case a tape is not loaded or the tape end is reached, or if the servo mechanism is working improperly, this indicator will start blinking to warn the operator of such faults.

Note: If the portable VTR is not connected to the camera, the Recording/Tally indicator will not light.

15. Viewfinder Height Adjustment Knob (UP/DOWN)

The height of the viewfinder can be adjusted by turning this knob. Adjustment of up to 20mm (13/16") is possible.

16. Viewfinder Mounting Base

The 1.5" Electronic Viewfinder WV-VF39E is mounted on the camera by first installing this base on the camera.

Refer to page 22 No. 2 for detailed mounting instructions.

17. Viewfinder Lock Lever

The viewfinder is locked and released through use of this lever.

When the lever is released, the viewfinder can be slid approximately 45 mm (1-3/4") laterally and 20 mm (13/16") back and forth. Be sure to lock the lever after having adjusted the viewfinder position.

18. Filter Wheel

To set the filter wheel, flip open the cover.

The filter wheel is a four-position wheel which controls two built-in colour temperature conversion filters and one ND filter.

(1) 3200°K — indoor light (tungsten, halogen, quartz lamps)
(2) 5600°K +12.5% ND — daylight (sunny)
(3) 5600°K — daylight (cloudy/rainy)
(4) Closed

Select the position according to the light source (see page 49). The position of the filter wheel is displayed in the viewfinder when the CHECK button ㉖ is pressed.

CAUTION: If the incorrect filter is selected, the Automatic White Balance Setting may not be completed.

19. Lens Hold Ring/Knob

Turn this ring/knob clockwise to secure the lens to the camera.

20. White Balance Selection Switch (WHITE BAL, AWC A/B/MANUAL)

This switch is used to select the white balance mode as follows:

AWC A: The white balance can be set automatically by pressing the Auto White/Auto Black Set Switch ⑥ upwards. The setting is stored in memory A.

AWC B: Similar to AWC A, but the setting is stored in memory B.

MANUAL: Proper white balance is achieved for 3200°K colour temperature with the Filter Wheel ⑱ set to position 1 and the Red Gain Control ㉚ and Blue Gain Control ㉙ set to their mechanical center.

Note:

1) Two white balance settings, one each for different lighting conditions such as indoor and outdoor, may be stored in the two memories AWC A and AWC B.
2) This switch should be set to the AWC A or AWC B position when the RCU is used.

21. High Gain Selection Switch (GAIN 0/+9 dB/+18 dB)

Normally set this switch to the 0 dB position. Positions +9 dB and +18 dB increase the video output amplitude for dark scenes and are equivalent to opening the lens iris 1.5 or 3 F-stops, respectively.

22. Colour Bar/–6 dB/Camera Selection Switch (BAR/–6 dB/CAMERA)

This switch selects the video output signal as follows:

BAR: An EBU colour bar is provided from the Video Output connector ㊷ , Monitor Output connector ㊽ and the VTR/RCU connector ⑨. The date and time display superimposed on the colour bar will be recorded. In addition, the system condition can also be recorded by pressing the Check Button (CHECK) ㉖ .

–6 dB: In combination with the High Gain Selection Switch ㉑ , the overall gain of the camera can be set to –6 dB, 0 dB, +3 dB, +9 dB, +12 dB or +18 dB. Refer to page 54 for setting and character display on viewfinder.

CAMERA: The actual picture as picked up through the lens is displayed.

Note: This switch is inoperative when the RCU is used.

23. Power Switch (DC POWER, OFF/SAVE/ON)

This switch selects the operating mode of the camera as follows:

OFF: Power to the camera is turned off.

SAVE: The main camera circuit is turned off. The heater of the CRT viewfinder is on, however. The Power Indicator ㉔ lights green at this position.

ON: The unit is in the operating condition after necessary adjustments have been made. The Power Indicator lights red.

Note: This switch should be set to the ON position when the camera is used with the Remote Control Unit (RCU).

24. Power Indicator (POWER)

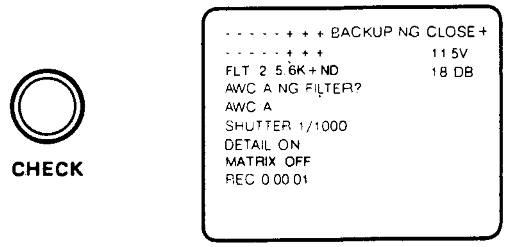
This indicator lights red when the camera is operating. When the camera is in the standby mode, the indicator lights green.

25. Fuse

A 5A 250V fuse is installed in the fuse holder. For continued protection of the equipment, do not install a fuse of a higher current rating.

26. Check Button (CHECK)

The operating conditions of the camera can be displayed on the viewfinder by keeping this button pressed. Refer to page 51 for details.



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- - - - - + + +              11 5V
FLT 2 5 6K + ND              18 DB
AWC A NG FILTER?
AWC A
SHUTTER 1/1000
DETAIL ON
MATRIX OFF
REC 0 00 01
```

27. Shutter Speed Selection Switch (1/120, 1/250, 1/500, 1/1000, 1/2000)

This switch selects the shutter speed of the electronic shutter. The switch can only be operated when the Electronic Shutter ON/OFF switch ㉘ is set to ON.

28. Shutter ON/OFF Switch (SHUTTER, ON/OFF)

Fast-moving objects shot as slow shutter speeds, such as is only possible on normal cameras, will appear blurred. This camera, however, features an electronic shutter which can be switched ON and OFF by this switch, and which enables blur-free recording of high-speed action, such as car racing, golf swings, gymnastics, birds in flight, and much more.

OFF: Normal recording with standard shutter speeds.

ON: The electronic shutter mode is engaged for blur-free recording of high-speed action. The electronic shutter speed can be set by the Shutter Speed Selection switch ㉗ . Refer to page 50 for details.

29. Blue Gain Control (B. GAIN)

This control only works when the White Balance Selection switch ⑳ is set to the MANUAL position. The control is used to match the blue gain with the colour signals of other cameras in a system.

Note: The Red and Blue Gain controls ㉚ & ㉙ cannot be operated when the White Balance Selection switch ⑳ is set to AWC A or AWC B position.

30. Red Gain Control (R. GAIN)

This control only works when the White Balance Selection switch ⑳ is set to the MANUAL position. The control is used to match the red gain with the colour signals of other cameras in the system.

31. Total Pedestal Level Control (T.PED)

This control can adjust the pedestal level of the video signal (luminance) for matching the pedestal level of more than two cameras in the system. Use a waveform monitor or oscilloscope for precise adjustment.

32. Detail Frequency Band Selection Switch (BAND, HIGH/LOW)

This switch selects the frequency band of detail/aperture correction for the sharpness of the picture as follows.

HIGH: This position suits for a wide-band VTR such as S-VHS or MII format VTR.

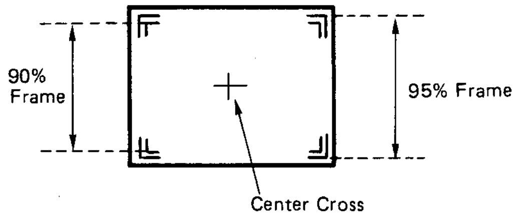
LOW: This position suits for 3/4" U-vision VTR or VHS VTR.

33. Level and Zone Indicator Switch (IND/ZONE, OFF/1/2)

This switch is used to on and off the zebra level indicator and safety zone indicator as follows.

Switch Position	OFF	1	2
Level (Zebra)	OFF	ON	ON
Safety Zone	OFF	OFF	ON

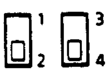
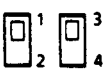
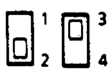
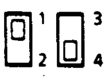
When this switch is set to 1 or 2 position, picture images exceeding the specified level (0.7Vp-p) will produce a zebra pattern in the viewfinder. In this case, the lens iris should be adjusted manually until the zebra pattern barely appears.
When this switch is set to 2 position, the safety zone frame is displayed in the viewfinder together with the zebra indicator.



Note: The center cross shows the electronic center of the picture and might not coincide with the optical center of the picture.

34. Subcarrier Phase Coarse Switches (SC PHASE COARSE)

The subcarrier phase of the camera signal can be adjusted from 0° to 360° in 90° steps with these switches, as shown below, for matching the phase of the subcarrier signal at the Gen-Lock Input connector ㊸. These switches should be set when the camera is used in a system configuration with the Special Effects Generator. Refer to page 42 for details.

Subcarrier Phase	0°	90°	180°	270°
Position of Switches				

35. Horizontal Phase Control (H.PHASE)

The horizontal phase of the camera signal can be adjusted to match the horizontal phase of the signal at the Gen-Lock Input connector ㊸.
This control should be adjusted when the camera is used in a system configuration with the Special Effects Generator. Refer to page 42 for details.

36. Recording Time Reset Button (RESET)

The accumulated recording time is displayed in the viewfinder under REC TIME while the CHECK button ㉖ is pressed. The time can be reset to "0 MIN" by pressing either this button or the one on the VTR AG-7450. Thus, total recording time can easily be checked by pressing this button at the outset of a new recording.

Note: For studio application, the time the Tally light lights is accumulated in the viewfinder REC TIME display.
The REC TIME displayed in the viewfinder and the one displayed on the AG-7450 might be different.

37. Lens Iris Control (IRIS)

The auto iris level can be adjusted by this control. When replacing the lens, check the output signal of the camera and make necessary adjustment with this control if this is required.

Note: If a zoom lens with an 8-pin connector is used, the Lens Connector Conversion Cable WV-LC10 must also be used. In this case the lens iris control will have no effect. If such adjustment should be necessary, please use the lens iris control on the lens.

38. Detail Level Selection Switch (DTL LEVEL HIGH/LOW/OFF)

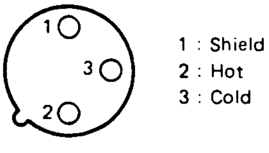
The detail/aperture level can be selected by this switch in three steps. Set the switch to the desired position while observing the sharpness of the picture.

39. Subcarrier Phase Fine Control (FINE)

This control allows fine adjustment of the subcarrier phase set by the Subcarrier Phase Coarse Switches ㉞. The control allows continuous control of up to +90° subcarrier phase to match the phase of the subcarrier signal obtained at the Gen-Lock Input connector ㊸. This control should be adjusted together with the Subcarrier Phase Coarse switches ㉞ when the camera is used in a system configuration including the Special Effects Generator. Refer to page 42 for details.

40. Microphone Connector (XLR, 3-pin) (MICROPHONE)

Connect the cord from the optional microphone WV-MC35 to this connector.



41. Camera Adaptor

The camera adaptor is pre-installed on the camera at the factory. The adaptor is required for ENG, EFP and studio applications. It should be removed if the camera is to be used with S-VHS or MII format portable VTRs. This will allow mounting the MII VTR adaptor WV-VT15 on the camera.

42. Video Output Connector (BNC) (VIDEO OUT)

A composite video signal is provided at this connector.

43. Gen-lock Input Connector (BNC) (GEN-LOCK)

The colour video signal of the camera is automatically synchronized to the gen-lock signal (composite or black burst) which is supplied to this connector. The gen-lock signal is used for system reference, such as when using the Special Effects Generator.

Caution: If the gen-lock signal is jittery (such as when obtained from VTR playback), the camera may not be able to synchronize properly.

44. Audio Monitor/Intercom Level Control (LEVEL)

Use this control to freely adjust the volume level in the earphone connected to the Audio Monitor Jack ⑫ or the headset connected to the Intercom Jack ⑪.

45. Power Selection Switch (POWER SELECT, BATT/EXT DC-VTR/RCU)

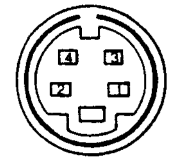
Using this switch, the desired power source connected to the camera may be freely selected.

BATT/EXT DC: This position is used for power supply from the battery pack, an external DC source or through an AC adaptor.

VTR/RCU: This position is used when power is to be supplied through the 32-pin connector from the VTR or the Remote Control Unit (RCU).

46. S-VHS Video Output Connector (S-VIDEO OUT)

The luminance (Y) and chroma (C) signals for S-VHS VTR or monitor are provided at this connector.

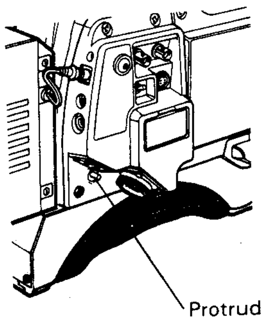


S-VIDEO OUT (female)

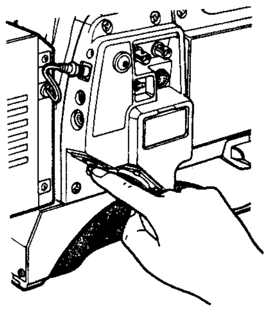
No.	CONTENTS
1	Y Ground
2	C Ground
3	Y Sigal Output
4	C Signal Output

47. Circuit Protector (BREAKER)

When an excessive current flows into the camera by accident or some other reason, the red button of this circuit protector protrudes to cut off the circuit.



After solving the problem, press the red button again to recover the circuit.



CAUTION:

Refer servicing to qualified service personnel to solve the problem.

48. Monitor Output Connector (BNC) (MONITOR OUT)

A composite video signal for monitoring is provided at this connector.

Note: This output signal might differ slightly from the output signal of the Video Output Connector ㊷.

49. Microphone

This is an unidirectional monaural electret condenser microphone. The microphone is highly sensitive to sounds coming from in front of it. The output level of the microphone is approximately −70 dB.

50. Microphone Holding Knobs

To secure the microphone, turn these knobs clockwise.

51. Audio Level Selection Switch (AUDIO LEVEL −20/−60 dB)

Two audio output levels to the VTR can be selected: −20 dB or −60 dB. The camera has been preset to −20 dB at the factory.

52. Audio Monitor Selection Switch (INT/PB)

This switch selects the audio signal from the Audio Monitor jack ⑫ to be monitored.

INT: The sound picked up by the microphone can be monitored.

PB: The played back audio portion from the 3/4" U-vision recorder, obtained through the 14-pin camera connector, can be monitored.

Note: The camera has been preset to the INT position at the factory.

53. VTR Video Output Selection Switch (VTR VIDEO ENC-Y/C)

This switch selects the video output signal supplied at the VTR/RCU connector ⑨.

ENC: A composite video signal is supplied for 1/2" VHS and 3/4" U-vision portable VTRs.

Y/C: A component signal (luminance (Y) and chrominance (C) signals) are supplied for S-VHS VTRs.

Note:

1) If this switch is set to the Y/C position, when a recorder other than an S-VHS recorder is used, colour recording cannot be made.
2) The camera has been preset to the ENC position at the factory.

54. VTR Compatibility Switch (⊕1/⊕2/⊖1)

Set this switch according to the VTR which is connected to the camera.

⊕1: For 1/2" VHS VTRs.

⊕2: For 3/4" U-vision VTRs, connected to the camera using a 14-pin connector, S-VHS VTRs and MII portable VTRs.

⊖1: If a VTR of other manufacture is used, and if this VTR pauses when the tape should be running and vice versa, this switch should be set to this position.

Note:

1) The switch has been preset to the ⊕1 position at the factory.
2) Some VTRs may not operate properly when connected to this camera, even though the setting of this switch is changed. Please consult your dealer for further information.

55. RCU/VTR Signal Selection Switch (RCU/VTR SIGNAL Y/C/B-Y/PR/PB-R/G/B).

This switch selects the video output signal supplied at the VTR/RCU connector ⑨ on the camera and the Red, Green and Blue Output Connectors (117) on the remote control unit (RCU). The switch has been set to the R/G/B position at the factory. Refer to page 20 and 39 for selecting the RCU/VTR Selection Switch.

Y/C/B: The chrominance (C) and luminance (Y) signals are supplied from the R, G and B Output Connecters (117) for S-VHS format VTR.

Y/PB/PR: The colour difference (R-Y & B-Y) signals and luminance (Y) signal are supplied from the VTR/RCU Connector ⑨ and the R, G and B Output Connectors (117) for MII format VTR.

R/G/B: The R, G and B signals are supplied from the R, G and B Output Connector (117).

Note: When connecting the VTR/RCU Connector ⑨ to the VTR other than MII format VTR by the VTR cable, set the switch to the R/G/B position.

56. 68-pin Multi Connector

When mounting the camera adaptor, engage the 68-pin connectors on the camera and the camera adaptor.

57. Camera Adaptor Holding Screw/Knob

The camera adaptor can be removed from the camera after loosening the two screws on the rear of the camera and one knob on the top of the camera. The camera adaptor has been pre-installed at the factory.

CIRCUIT DESCRIPTION
FOR WV-F350

1. Outline

Incoming light which contains red (R), green (G) and blue (B) information enters a prism through a zoom lens and separated into the Y and C signal component respectively. The separated R, G and B signal component go to the respective frame interline transfer (FIT) CCD image sensor and converted into the modulated signal whose peak-to-peak level corresponds to the incoming light intensity. The CCD drive pulse generator on the Drive board generates a horizontal (H) and a vertical (V) transfer pulse which are synchronized with the horizontal and vertical drive (HD & VD) pulses and sends them to the CCD image sensors for driving the sensors. The modulated signals from the CCD image sensors are then sent to the preamplifier circuit in the Preamplifier board. In the preamplifier circuit, these signals are detected by the correlative double-sampling and the video signals are obtained.

The R, G and B signal thus made are respectively fed to the signal processing circuit in the process board where their gain is controlled by setting the High Gain Selection Switch. In the signal processing circuit, the black level of these signals between the 0dB and +18dB position of the High Gain Selection Switch are automatically aligned and the gain of the R and B signals are automatically adjusted to match them with that of G signal for the white balance setting by the DC voltages supplied from the Auto board. The black level variation of R, G and B signals due to the lens flare is also compensated in this circuit.

Then the R and B signals are fed to the Auto Black Control circuit and supplied to the Microprocessor IC1 on the Auto board. The black level of the R and B signals are automatically adjusted by Microprocessor and DC level demultiplex circuit using the signal of the Auto Black Control circuit.

The R, G and B signals whose pedestal levels are set are applied to the gamma correction circuit in IC to correct the non-linear photoelectric conversion characteristic of cathode ray tube and to produce a linear picture of high fidelity. The signals from the gamma correction circuits are non-additively mixed each other and the highest signal is detected. The highest signal is supplied to the lens iris control circuit and used to control the lens iris corresponding to the incoming light intensity.

The R, G and B signal from the Process board is supplied to the detail generator circuit in the Detail/Shading board and mixed with 1H detail signal to enhance the horizontal and vertical sharpness.

The R, G and B signals are then supplied to the camera/bar select circuit in the Sync/Encoder board. The R, G and B bar signals are also sent to the select circuit from the color bar generator circuit. These signals are selected by setting the Color Bar/Camera Selection Switch and sent to the R-Y, B-Y and luminance (Y) matrix circuit respectively. The R-Y and B-Y signal are fed to the chrome processing circuit where these signals modulate the subcarrier (SC) signal from the sync pulse generator IC and the chrominance signal is made. The chrominance signal is sent to the C/Y Mix circuit in the Camera Adaptor [WV-AD250]. Where it is mixed with Y signal to make a video signal. The video signal is sent to other system products through the video output connector. The Y signal (component output) are fed to the MII format VTR for recording. The Y signal is also fed through the viewfinder signal processing circuit to the viewfinder together with the character signal and the zebra pattern signal.

The 17.7MHz frequency oscillated in the internal 17.7MHz oscillator in the Sync/Encoder board is fed to the sync pulse generator. The subcarrier signal and the pulses necessary for making a video signal are sent to other circuit through the pulse generator circuit. The sync separation circuit receives the black burst signal or composite video signal supplied to the gen-lock input connector. In the gen-lock circuit, the subcarrier (SC) signal and the horizontal drive (HD) pulse generated in the sync generator circuit are compared in phased with those separated from the gen-lock signal and the error in comparison controls the 17MHz voltage controlled oscillator. The 17MHz signal is fed to the sync generator circuit to generate the subcarrier signal and the horizontal drive pulse. As a result, the phase locked loop (PLL) is formed and the sync generator circuit generates the subcarrier signal and pulses which are synchronized with the gen-lock signal.

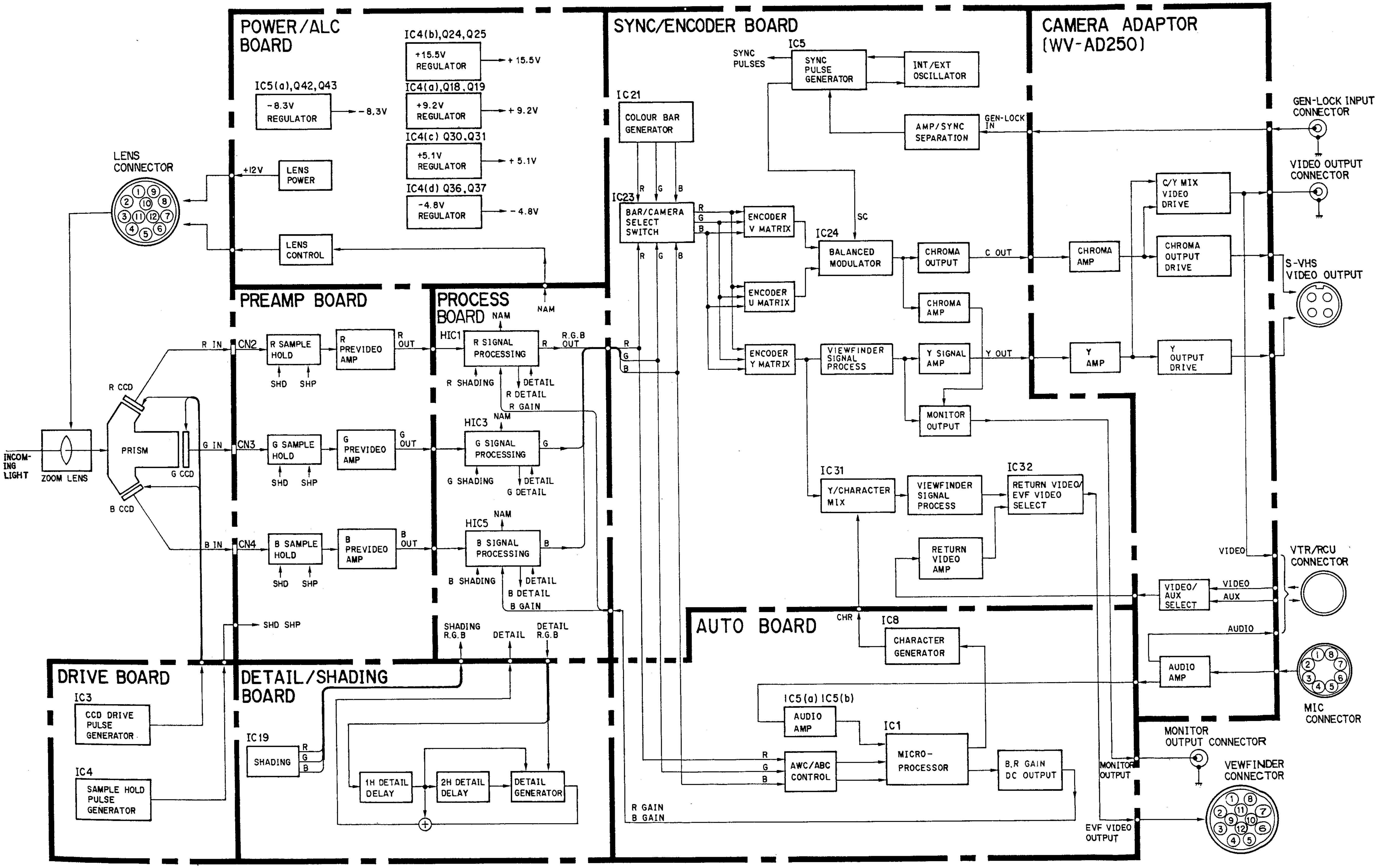
The R, G and B signals are sent to the auto-white control circuit and the auto-black control circuit. In the auto-white control circuit, the R and B signal levels are compared with the reference G signal and the error level in comparison is sent to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B signal processing circuits to control the gain of the R and B signal and to match them with the G signal level. In this way, the R, G and B signal levels become same and the white balance is automatically set.

Similarly, the dark level of the R and B signals are compared with that of G signal in the auto-black control circuit and the resultant in comparison is fed to the microprocessor. The microprocessor sends the DC voltages via the auto control output circuit to the R and B pedestal control circuit in order to control the black level of the R and B signal and to match them with that of G signal automatically. During the black balance setting, the black level of the R, G and B signals at the +18dB position of the High Gain Selection Switch are respectively compared with those at the 0dB position using the auto-black balance setting circuitry. The output in comparison is fed to the microprocessor and the microprocessor supplies the DC voltage through the auto control output circuit to the R, G and B signal processing circuit in the Process board to control the black levels in the +18dB position for matching with those in the 0dB position automatically.

When the automatic white or black balance setting fails, the microprocessor sends the signal to the character generator to generate the warning character. The warning character is displayed in the viewfinder through the viewfinder signal processing circuit in the Sync/Encoder board.

The power circuit generates from +12V DC the DC voltages used in the camera and sends them to other boards.

Outline of WV-F350E


POWER/ALC BOARD
IC5(a),Q42,Q43
-8.3V REGULATOR
-8.3V
IC4(b),Q24,Q25
+15.5V REGULATOR
+15.5V
IC4(a),Q18,Q19
+9.2V REGULATOR
+9.2V
IC4(c) Q30,Q31
+5.1V REGULATOR
+5.1V
IC4(d) Q36,Q37
-4.8V REGULATOR
-4.8V
+12V
LENS POWER
LENS CONTROL
LENS CONNECTOR
INCOM-ING LIGHT
ZOOM LENS
PRISM
R CCD
G CCD
B CCD
PREAMP BOARD
R IN
CN2
R SAMPLE HOLD
R PREVIDEO AMP
R OUT
G IN
CN3
G SAMPLE HOLD
G PREVIDEO AMP
G OUT
B IN
CN4
B SAMPLE HOLD
B PREVIDEO AMP
B OUT
SHD
SHP
SHD SHP
PROCESS BOARD
NAM
HIC1
R SIGNAL PROCESSING
R.G.B OUT
R SHADING
DETAIL
R DETAIL
R GAIN
HIC3
G SIGNAL PROCESSING
G SHADING
G DETAIL
HIC5
B SIGNAL PROCESSING
B SHADING
B DETAIL
B GAIN
SHADING R.G.B
DETAIL
DETAIL R.G.B
DRIVE BOARD
IC3
CCD DRIVE PULSE GENERATOR
IC4
SAMPLE HOLD PULSE GENERATOR
DETAIL/SHADING BOARD
IC19
SHADING
1H DETAIL DELAY
2H DETAIL DELAY
DETAIL GENERATOR
SYNC/ENCODER BOARD
IC5
SYNC PULSES
SYNC PULSE GENERATOR
INT/EXT OSCILLATOR
IC21
COLOUR BAR GENERATOR
AMP/SYNC SEPARATION
GEN-LOCK IN
IC23
BAR/CAMERA SELECT SWITCH
ENCODER V MATRIX
ENCODER U MATRIX
ENCODER Y MATRIX
SC
IC24
BALANCED MODULATOR
CHROMA OUTPUT
C OUT
CHROMA AMP
VIEWFINDER SIGNAL PROCESS
Y SIGNAL AMP
Y OUT
MONITOR OUTPUT
IC31
Y/CHARACTER MIX
VIEWFINDER SIGNAL PROCESS
IC32
RETURN VIDEO/ EVF VIDEO SELECT
RETURN VIDEO AMP
AUTO BOARD
CHR
IC8
CHARACTER GENERATOR
IC5(a) IC5(b)
AUDIO AMP
IC1
MICRO-PROCESSOR
AWC/ABC CONTROL
B.R GAIN DC OUTPUT
R GAIN
B GAIN
CAMERA ADAPTOR (WV-AD250)
C/Y MIX VIDEO DRIVE
CHROMA AMP
CHROMA OUTPUT DRIVE
Y AMP
Y OUTPUT DRIVE
VIDEO/ AUX SELECT
AUDIO AMP
MONITOR OUTPUT
EVF VIDEO OUTPUT
GEN-LOCK INPUT CONNECTOR
VIDEO OUTPUT CONNECTOR
S-VHS VIDEO OUTPUT
VTR/RCU CONNECTOR
VIDEO
AUX
AUDIO
MIC CONNECTOR
MONITOR OUTPUT CONNECTOR
VEWFINDER CONNECTOR

2. CCD & Prism Assembly

2-1 CCD & Prism Assembly

The incoming light which contains the red (R), green (G) and blue (B) information enters the optical system through a zoom lens and a color temperature conversion filter.
The optics system using a dichroic prism separates the incoming light into three primary color lights, red, green and blue. The separated light enters corresponding CCD image sensor respectively to convert it into the video signal.

- Color Temperature Conversion Filter

Generally, the human eye is sensitive to electromagnetic waves from 380 mμ(mμ = nm) to 780 mμ in wavelength (the visible region). In addition, the eye also discerns the wavelength difference as a color difference, seeing light between 400mμ to 500mμ wavelength as predominantly blue information, the light between 500mμ to 600mμ as green information and the light between 600mμ to 700mμ as red information. The entire light in the visible range of wavelength from 380mμ to 780mμ is seen as different amount of white light.

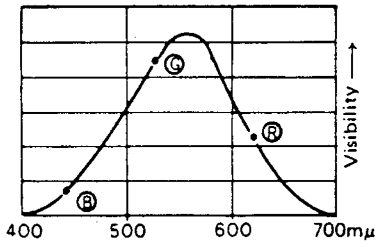


Fig. 2-1 Standard Luminosity Curve

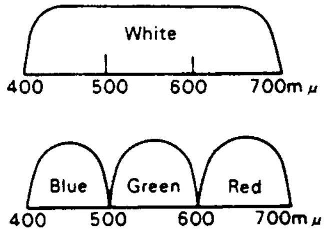


Fig. 2-2 The Visible Spectrum

When a carbon is burned, it emits light of a different quality depending on how hot it is. Various natural light can be expressed in terms of a color temperature which may be referred to a light emitted from the burning carbon used as a standard. A light source of 3200°K (K = Kelvin : -273°C corresponds to 0°K an absolute temperature) color temperature, which is used in studios, implies that its quality (color) is the same as that emitted from the carbon burning at 3200°K (2927°C).

The relationship between the color temperature of light sources used for illumination and weather conditions are shown in Fig. 2-3. The color temperature goes up as the weather turns rainy from clear. This may be related to the burning carbon (charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature), it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at a low color temperature is considered reddish and at high color temperature is considered bluish.
When a color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture. When the color camera is pointed at an object illuminated by a light of high color temperature, it produces a bluish picture. This camera is designed to be used under the light whose color temperature is 3200°K, and it has the 4-position color temperature conversion filter wheel which converts the color temperature of incoming light to 3200°K.
When the filter wheel is set to the position 1, the transparent filter is inserted into the light path. When it is set to position 2, the 5600°K color temperature conversion filter with 1/8 neutral density (ND) filter is inserted into the light path and the 5600°K light is converted to the 3200°K light. The position 3 is used for fine day outdoor. When it is set to the position 3, the 5600°K color temperature conversion filter is inserted into the light path and the 5600°K color temperature conversion filter is inserted into the light path and the 5600°K light is converted to the 3200°K light. The position 4 is for closing the lens. In addition to the color temperature conversion filter wheel, this camera is so designed that the level of red and blue signals can be set automatically to match the color temperature of the light source which illuminates the object in order to ensure proper color reproduction.

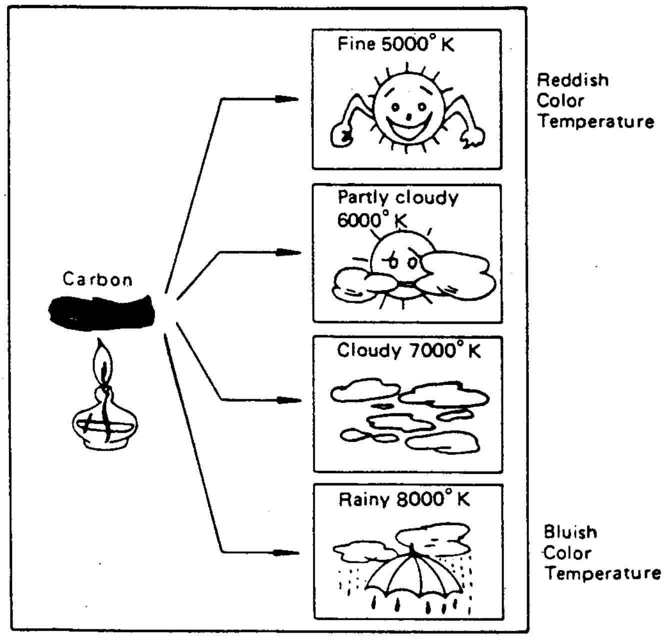


Fig. 2-3 Color Temperature and Weather Condition

The blue (B) light is reflected at the boundary face between the 1st and 2nd prism and the surface of 1st prism, and enters to the B CCD image sensor through the trimming filter and infrared (IR) cut filter. The red (R) and green (G) lights pass through the boundary between 1st and 2nd prism.

- Trimming Filter

The boundary face between the 1st and 2nd prism also reflects a little red and green light, not only blue light. The trimming filter passes only the blue light and prevents the red and green light going to the blue CCD image sensor.

- Infrared (IR) Cut Filter

As shown in Fig. 2-4, the CCD image sensor has some sensitivity in the infrared region beyond the visible range. The infrared (IR) cut filter cuts off the infrared light rays which the human eye does not see as light. If the color signal is made by using the video signal corresponding to the infrared rays which the human eye can not normally see, the colors of pictures on the monitor and that seen with the naked eye would differ substantially.

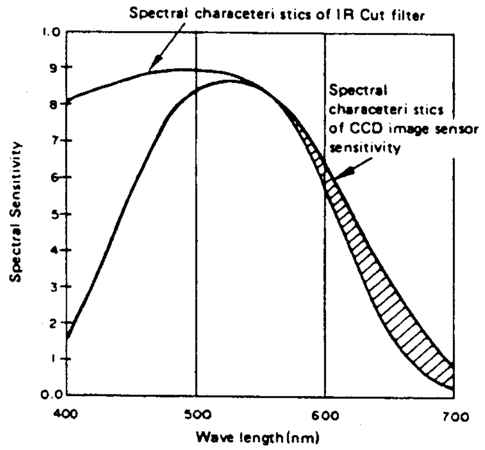


Fig. 2-4 IR Cut Filter Response

The red (R) and green (G) lights reach on the boundary between the 2nd and 3rd prism and only the R light reflects. The reflected R light is again reflected by the boundary between the 1st and 2nd prism, and enters the R CCD image sensor through the trimming filter and the IR cut filter as in the case of the B light.
The remaining green (G) light which passes through the boundary between the 2nd and 3rd prism goes to the G ccd image sensor through the trimming filter and the IR cut filter as in the case of the B and R lights.

2-2 CCD Image Sensor

The CCD image sensor IC101(R) (IC201(G), IC301(B)) receives CCD drive pulses such as vertical drive pulses øV1, øV2, øV3, øV4, horizontal drive pulses øH1, øH2 and Reset pulse øR.
The horizontal drive pulses are supplied from øH pulse drive IC102(R) (IC202(G), IC302(B)) to the CCD image sensor IC101(R) IC201(G), IC301(B)).
The CCD Reset pulse øR is supplied from Reset pulse drive Q201 and Q202 to the CCD image sensor R, G and B respectively.
Then the incoming light received from the CCD image sensor is converted to the prevideo signal controlled by these pulses.
The R, G and B prevideo signals corresponded with the incoming light are then obtained base of buffer Q101, Q201 and Q301.
Thus the R, G and B prevideo signals are supplied through CN2, CN3 and CN4 to the Preamplifier board.

- CCD Image Sensor

The CCD image sensor used in camera is frame interline transfer (FIT)CCD sensor.
The CCD image sensor has 415,000 picture elements in total (horizontal 716 × vertical 582).
Its image size is 6.52mm (H) × 4.83mm (V) so that 1/2-inch optics and lens can be used.
The CCD image sensor is mounted on dual in line package with 20 pins and has a optical window in front of the cell as shown in Fig 2-5.

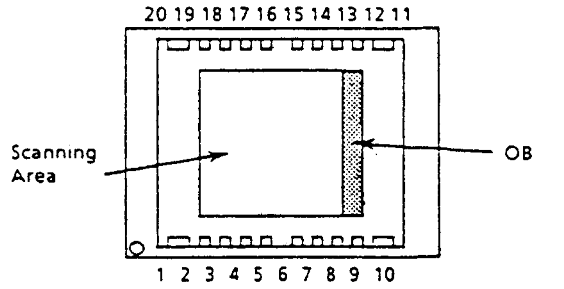


Fig. 2-5 Appearance of CCD Image Sensor

Items	Value	Unit
Chip Size	8.78 (V) × 7.85 (H)	mm²
Cell Size	8.30 (V) × 9.10(H)	μm²
Image Size	4.83 (V) × 6.52(H)	mm²
Number of Elements	582 (V) × 716(H) (Excluding O. B)	PCS

Table 1 Specification of CCD Image Sensor

The pin identification of CCD image sensor is as follows.

Pin No	Name	Description
1	OD	Output Drain
2	øR	Reset Pulse
3	RD	Reset Drain
4	VO	Video Output
5	LG	Gate of Output Load Transistor
6	OG	Output Gate
7	øH2	H Transfer 2
8	øH1	H Transfer 1
9	IS	Input Source
10	Sub	Substratum
11	øVB4	V Transfer Pulse B4
12	øVB2	V Transfer Pulse B2
13	øVB3	V Transfer Pulse B3
14	øVB1	V Transfer Pulse B1
15	PT	Protection P-Well
16	øVA4	V Transfer Pulse A4
17	øVA2	V Transfer Pulse A2
18	øVA3	V Transfer Pulse A3
19	øVA1	V Transfer Pulse A1
20	PW	P-Well

- Constitution and Outline of Transfer of CCD Image Sensor

CCD image sensor is made up of a simple MOS structure and consists of ;

(1) Photo diode(PD) ..	Generates charge packets corresponding to the incoming light intensity.
(2) V-CCD	Accumulates the charge packets from PD and transfers them in the storage area.
(3) Storage section ...	Store the charge packets received from the V-CCD and transfer then to H-CCD.
(4) H-CCD	Transfers charge packets in the horizontal direction on the output.
(5) Output Amp	Outputs the signal transferred from the H-CCD sequentially.

The block diagram of CCD image sensor is shown below. Each pixel corresponds to one photo diode.

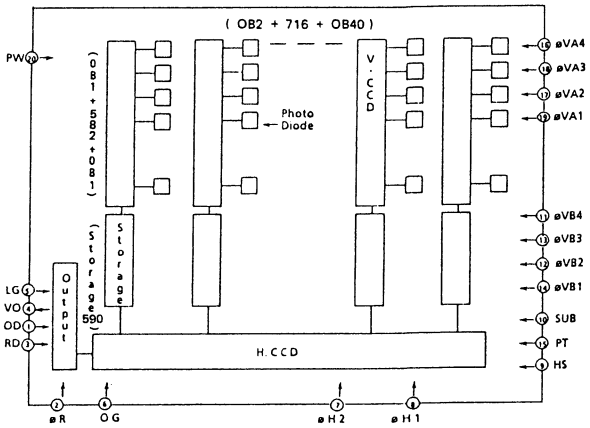


Fig.2-6 Block Diagram of CCD Image Sensor

- Frame Interline Transfer System

When the incoming light reaches the photo diode, the signal-charges are accumulated in proportion to the intensity of light.

Accumulated charge packets on the independent sensor (photo diode) are transferred to the vertical shift register (V-CCD) all at once in every vertical blanking period. The charge packets in V-CCD are then transferred to the storage area all at once in V blanking period by much faster speed. They are then shifted one-step down to the horizontal shift register (H-CCD) in every horizontal blanking period. The charge packets in H-CCD are transferred to the output amplifier by turns, and taken out as the output signal.

2-3 øH Pulse Driver/Reset Pulse Driver

The horizontal drive pulses øH1, øH2, and reset pulse øR are supplied from the CCD drive pulse generator IC1 on the Drive board. These pulses are fed to the CCD image sensor IC101 (R) (IC201(G) IC301(B)) through the øH pulse drive IC102(R) (IC202(G), IC302(B)) and the reset pulse driver Q201 and Q202.

3. Drive Board

3-1 CCD Drive Pulse Generator

The CCD drive pulse generator IC1 receives vertical drive pulse (VD) from the sync generator IC5 on the Sync/Encoder board through the PLL IC2 and horizontal drive pulse (HD) from Sync generator IC5 through the PLL IC2. And the IC1 generates pulses for the CCD image sensor R, G and B.

3-2 CCD Pulse Driver Circuit

This circuit amplifies the pulses such as øVA1-øVA4, and øVB1-øVB4, and their levels are controlled by Q20-Q23 respectively.
These pulses are supplied through CN1 to the Sensor board.

3-3 Sample Hold Pulse Driver Circuit

This circuit controls the sample hold pulse SHP (Precharge Sample Hold Pulse), SHD (Data Sample Hold Pulse) and DL øH pulses.
SHP and SHD pulses are controlled by sample hold pulse drive IC4 and DLøH pulse is controlled by IC3.
These pulses are supplied through CN2 to the Preamplifier board.

3-4 Bias Control Circuit

The DC bias voltage for R output gate (G output gate, B output gate) and R sub (G sub, B sub) is generated by R output gate control Q7 (G output gain control Q6, B output gain control Q5) and R sub control Q4 (G sub control Q3, B sub control Q2) respectively.
These DC bias voltage are supplied to the CCD image sensor on the sensor board through connector CN2.

3-5 Voltage Regulator Circuit

- +9V Regulator

The +9V DC voltage is generated by IC6 (d), Q15 and Q16 using +9.2V DC Voltage supplied from the Power/ALC board. And the produced DC bias voltage is obtained at the collector of Q15.

- +15V Regulator

The +15V DC voltage is generated by IC6 (c), Q8 and Q9 using +15.5V DC voltage supplied from the Power/ALC board. And the produced DC voltage is obtained at the collector of Q8.
One of the output voltage is used to generate the DC bias voltage R output gate (G output gate, B output gate) and R sub (G sub, B sub) in the bias control circuit Q5-Q7 and Q2-Q4 respectively.
The other, the output voltage is supplied to the Sensor board through CN2 and used for the CCD image sensor and prevideo buffer amplifier.

- +5V Regulator

The +5V DC voltage is generated by IC6 (a), Q12 and Q13 using +5.1V DC voltage supplied from the Power/ALC board. The produced DC voltage is obtained at the collector of Q12. And the output voltage is supplied to several ICs on the Drive board.

- -8V Regulator

The -8V DC voltage is generated by IC6 (b), Q10 and Q11 using -8.3V DC voltage supplied from the Power/ALC board. The produced DC voltage is obtained at the collector of Q10. And the output voltage is supplied through CN1 to the Sensor board.

4. Preamplifier Board

4-1 R Sample Hold Circuit

This circuit receives the modulated R signal from the R channel CCD board and detects the R signal.
The R signal (A) is fed through buffer Q101 to clamp circuit consists of Q102, R103, C105 and Q103 where the noise portion of modulated R signal is clamped by the sample hold pulse DP1 (SHP) (B) sent to the gate of Q102. The clamped video signal (C) is sent through buffer Q104 to sample hold circuit consisting of Q105, R109, C107 and Q106 where the video component (C) is gated by another sample hold pulse DP3 (SHD) (D) fed to the gate of Q105 and the video component (E) is mode. The video signal (E) is then sent to one input of differential amplifier consisting of Q107, Q108 and Q109.
On the other hand, the noise signal (F) is sent to sample hold circuit consisting of Q114, R128, C115 and Q115 where the noise signal is generated by the sample hold pulse DP3 (SHD) (D) fed to the gate of Q114. The noise signal (F) is then applied to the other input of differential amplifier where the R signal (E) and the noise (F) are subtracted each other and the noise mixed with the R signal (E) is removed. The R signal (G) thus obtained is sent to 12.7MHz low pass filter (LPF) CF101, and the R signal (H) is obtained. The R signal is then sent to the process circuit on the Process board. Through amplifier consisting of Q116 and Q117, E2, Mother board and CN1 .

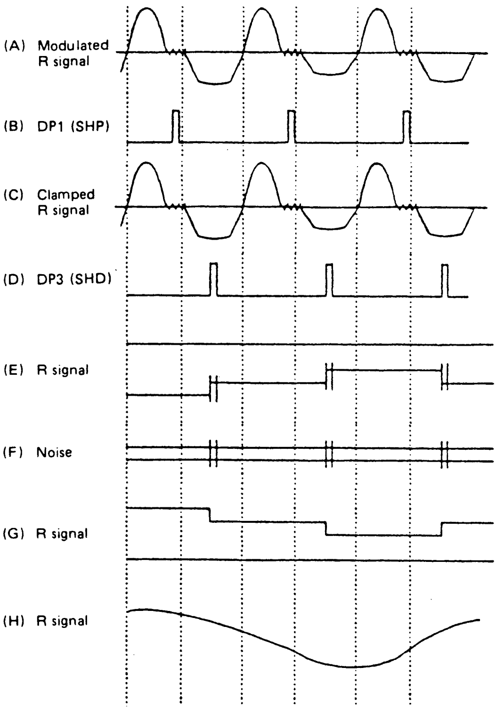


Fig. 4-1 Sample Hold

4-2 G Sample Hold Circuit

This circuit receives the modulated G signal from the G channel CCD board and detects the G signal.

A function of this circuit is the same manar as R sample hold circuit. But the reference numbers of the component parts are changed as follows.

Example : Q101 → Q201
R101 → R201
CF101 → CF201

4-3 B Sample Hold Circuit

This circuit receives the modulated B signal from the B channel CCD board and detects the B signal.

A function of this circuit is the same manar as R sample hold circuit. But the reference numbers of the component parts are changed as follows.

Example : Q101 → Q301
R101 → R301
CF101 → CF301

4-4 + 8.9V Regulator

The +8.9V DC voltage is generated by IC2(b), Q3 and Q2 using +9.2V DC voltage supplied from the Power/ALC board. The generated DC voltage is obtained at the collector of Q2.

And the output voltage is supplied to the Sample hold circuit and the Prevideo amplifier circuit.

4-5 + 4.9V Regulator

The +4.9V DC voltage is produced IC2(a), Q5 and Q4 using +5.1V DC voltage supplied from the Power/ALC board. The generated DC voltage is obtained at the collector of Q4.

And the output voltage is supplied to the Sample hold circuit and the Prevideo amplifier circuit.

4-6 − 4.6V Regulator

The -4.6V DC voltage is produced IC2(c), Q7 and Q6 using -4.8V DC voltage supplied from the Power/ALC board. The generated DC voltage is obtained at the collector of Q6.

And the output voltage is supplied to the Sample hold circuit and the Prevideo amplifier circuit.

5. Process Board

5-1 R.G.B. Process Circuit

This circuit receives R.G and B signal from the Preamplifier board and R.G and B signals are corrected in order to make video signal.

5-1-1 R Process Circuit -1

The R signal obtained at pin6 of CN1 is fed through pin57 of HIC1 to the following circuit in HIC1. (Refer to Fig. 5-1)

- Shading Correction/Pulse Cancel Circuit

The R dark shading correction signal and R pulse cancel DC voltage are supplied to shading pulse/ cancel selection switch in HIC to be selected using horizontal drive (HD) pulse. And the selected signal is sent to the shading correction/pulse cancel circuit in order to match the R pedestal level between 0dB and 18dBwhen the Auto White/Auto Black Set Switch on the front of the camera is set to the ABC position.

The R pulse cancel DC level is controlled by VR21 (R PULSE CANCEL).

- Flare Compensation Circuit

The R signal is sent through VR2 (R FLARE GAIN) to this circuit and converted into DC voltage corresponding to the R signal level.
VR3 (R FLARE OFFSET) is a control for the DC offset voltage in order to match the compensation value to the R black level variation. The DC voltage is sent to analog switch controlled by the preblanking (PBL) pulse.

- High Gain Control/Gain Control Circuit

This circuit controls the level of the R signal by changing the gain of circuit when the camera gain is selected to -6dB, 0dB, +3dB, +9dB, +12dB or +18dB position by Setting the High Gain Selection switch and -6dB ON/OFF switch.

- Pedestal Control Circuit

This circuit controls the pedestal level of the R signal by adjusting VR27 (R PEDESTAL LEVEL). Setting to the RCU operation mode, the pedestal control DC from RCU is fed through R Pedestal Level CAM/RCU Select IC10 (a) on the Mother board to pin5 of CN1 on the Process board. The pedestal control DC from the Auto board or RCU is selected by this analog switch IC10 (a) using RCU/CAM selection signal.

- Video Amplifier Circuit

The R video signal is sent to HIC2 through this circuit.

- NAM (non-additive mixing) Video Amplifier Circuit

This circuit sends NAM(non-additive mixing) video signal to the lens control circuit on the Power/ALC board in order to control the lens iris automatically.

5-1-2 R Process Circuit-2

The R signal obtained at pin9 of HIC2 is returned to HIC1 through pin41 of HIC1. And the R signal is fed to the following circuit in HIC1. (Refer to Fig. 5-2)

- Gamma Correction

This circuit corrects the non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and reproduces a linear picture of high fidelity on the color monitor. In order for a televised picture to have the same contrast gradation as the original scene, the system (including the CCD image sensor, signal processing inside camera and monitor, and CRT) gamma must be equal to 1.
The gamma characteristic of CCD image sensor is approx. 1.0 and the gamma characteristic of the monitor CRT is approx. 2.2, so that the gamma characteristic of the gamma correction circuit should be approx. 0.45, Which markes the total gamma to be approx. 1.0.

The fine gamma corrected R signal is fed to VR30 (R GAMMA) through pin40 of HIC1. On the other hand, linear R signal is also supplied to VR30 (R GAMMA) through pin 39 of HIC1. Then both of R signals are mixed at VR30 which sets the gamma correction characteristic to approximate 0.45.

When the High Gain Selection Switch on the side of camera is set to +18dB (Gain-2) position or shutter ON/OFF Switch on the side of camera is set to ON position, the R signal is corrected by VR5 (R +18dB GAMMA) or VR6 (R +18dB SHTR GAMMA) and these corrected signals are sent to Gamma Level Selector (digitally controlled analog switch).
The R signal is selected by Gamma Level Selector using GAIN-2 (+18dB) and SHTR signals. These control signals are fed to pin19 and pin20 of HIC1 respectively.
The Gamma ON/OFF Switch on the Process board is used for the gamma correction adjustment. When the Gamma ON/OFF Switch on the Process board is set to OFF position, the linear R signal is selected by Gamma Level Selector and sent to the white clip circuit in HIC1. And this linear R signal is used for adjustment of the Gain-2 (+18dB) and Shutter mode gamma correction.
The Gamma ON/OFF Switch on the Process board is set to ON position normally.
Thus the gamma corrected R signal is sent to the white clip circuit in HIC1.

- White Clip Circuit

This circuit clips the high level on the R signal by adjustment VR4 (R WHITE CLIP).
And the clipped R signal is sent to the Detail/Shading board and Delay line DL1 respectively in order to make the aperture signal.

- Detail/Matrix Mix Circuit

The R signal sent from white clip circuit in HIC1 is fed to Detail/Matrix circuit in HIC1 through Delay Line DL1 and VR7 (R GAIN) on the Process board.
In this circuit the R signal is mixed with (R-G) signal, (R-B) signal from R/G/B matrix circuit and aperture signal from Detail/Shading board.

- Clamp/Black Clip Circuit

The R signal sent from Detail/Matrix circuit in HIC1 is fed to the clamp circuit through pin30 of HIC1 where the blanking period of R signal is clipped by the clamp pulse supplied to pin45 of HIC1.
The R signal is then fed to black clip circuit where its low level is clipped for setting the pedestal level.
Then the R signal is sent to the Sync/Encoder board and the Auto board through pin33 of HIC1 and pin33 of the Process board.

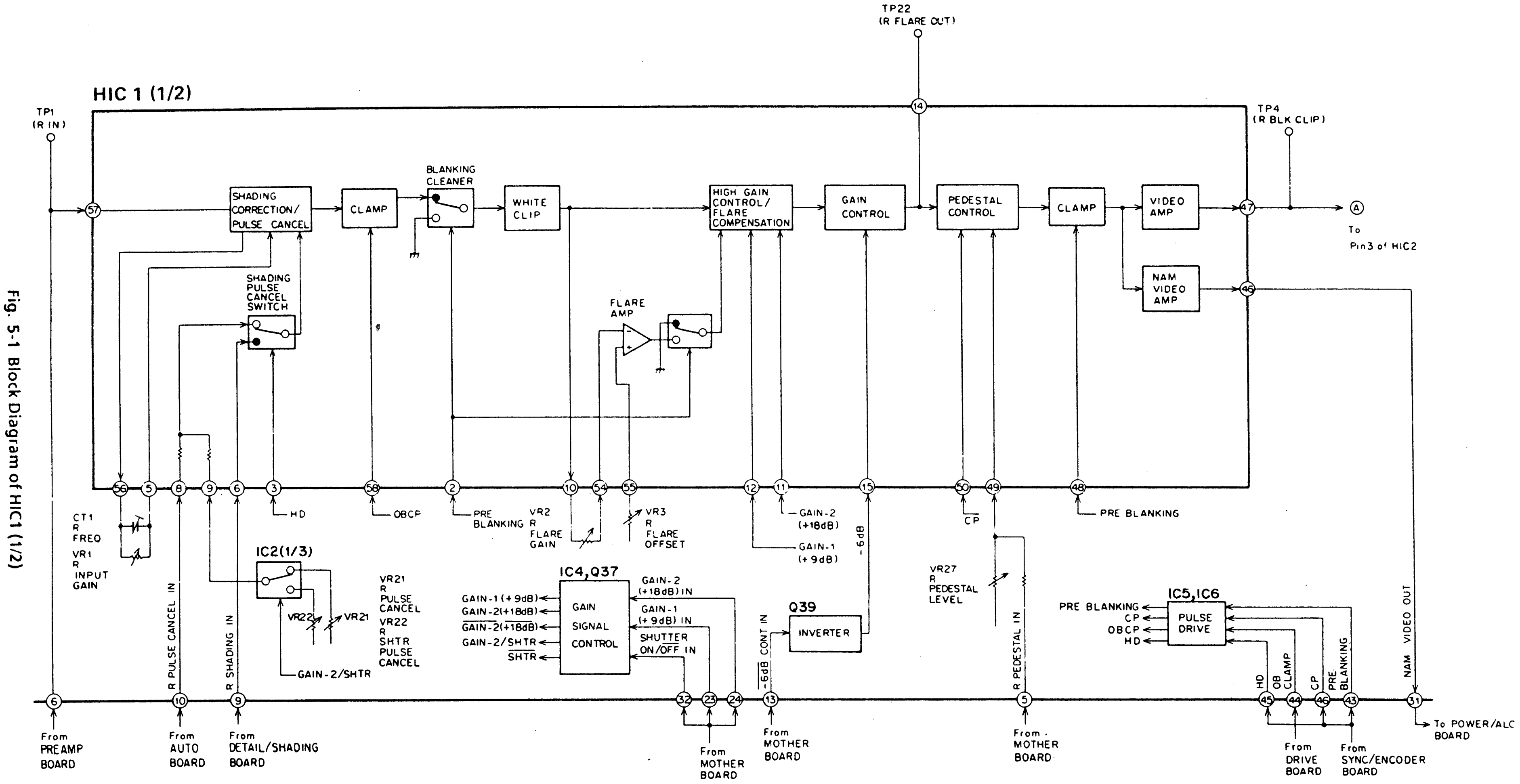

HIC 1 (1/2)
TP1
(R IN)
TP22
(R FLARE OUT)
TP4
(R BLK CLIP)
SHADING CORRECTION/ PULSE CANCEL
CLAMP
BLANKING CLEANER
WHITE CLIP
HIGH GAIN CONTROL/ FLARE COMPENSATION
GAIN CONTROL
PEDESTAL CONTROL
CLAMP
VIDEO AMP
NAM VIDEO AMP
A
To
Pin3 of HIC2
SHADING PULSE CANCEL SWITCH
FLARE AMP
56
5
8
9
6
3
58
2
10
54
55
12
11
15
50
49
48
57
14
47
46
HD
OBCP
PRE BLANKING
VR2
R
FLARE
GAIN
VR3
R
FLARE
OFFSET
GAIN-2
(+18dB)
GAIN-1
(+9dB)
-6dB
CP
PRE BLANKING
CT1
R
FREQ
VR1
R
INPUT
GAIN
IC2(1/3)
VR22
VR21
VR21
R
PULSE
CANCEL
VR22
R
SHTR
PULSE
CANCEL
GAIN-2/SHTR
IC4,Q37
GAIN-1 (+9dB)
GAIN-2(+18dB)
GAIN-2(+18dB)
GAIN-2/SHTR
SHTR
GAIN SIGNAL CONTROL
GAIN-2
(+18dB) IN
GAIN-1
(+9dB) IN
SHUTTER
ON/OFF IN
Q39
INVERTER
-6dB CONT IN
VR27
R
PEDESTAL
LEVEL
R PEDESTAL IN
IC5,IC6
PULSE DRIVE
PRE BLANKING
CP
OBCP
HD
HD
OB CLAMP
CP
PRE BLANKING
NAM VIDEO OUT
R PULSE CANCEL IN
R SHADING IN
6
10
9
32
23
24
13
5
45
44
46
43
31
From
PREAMP
BOARD
From
AUTO
BOARD
From
DETAIL/SHADING
BOARD
From
MOTHER
BOARD
From
MOTHER
BOARD
From
MOTHER
BOARD
From
DRIVE
BOARD
From
SYNC/ENCODER
BOARD
To POWER/ALC
BOARD

Fig. 5-1 Block Diagram of HIC1 (1/2)

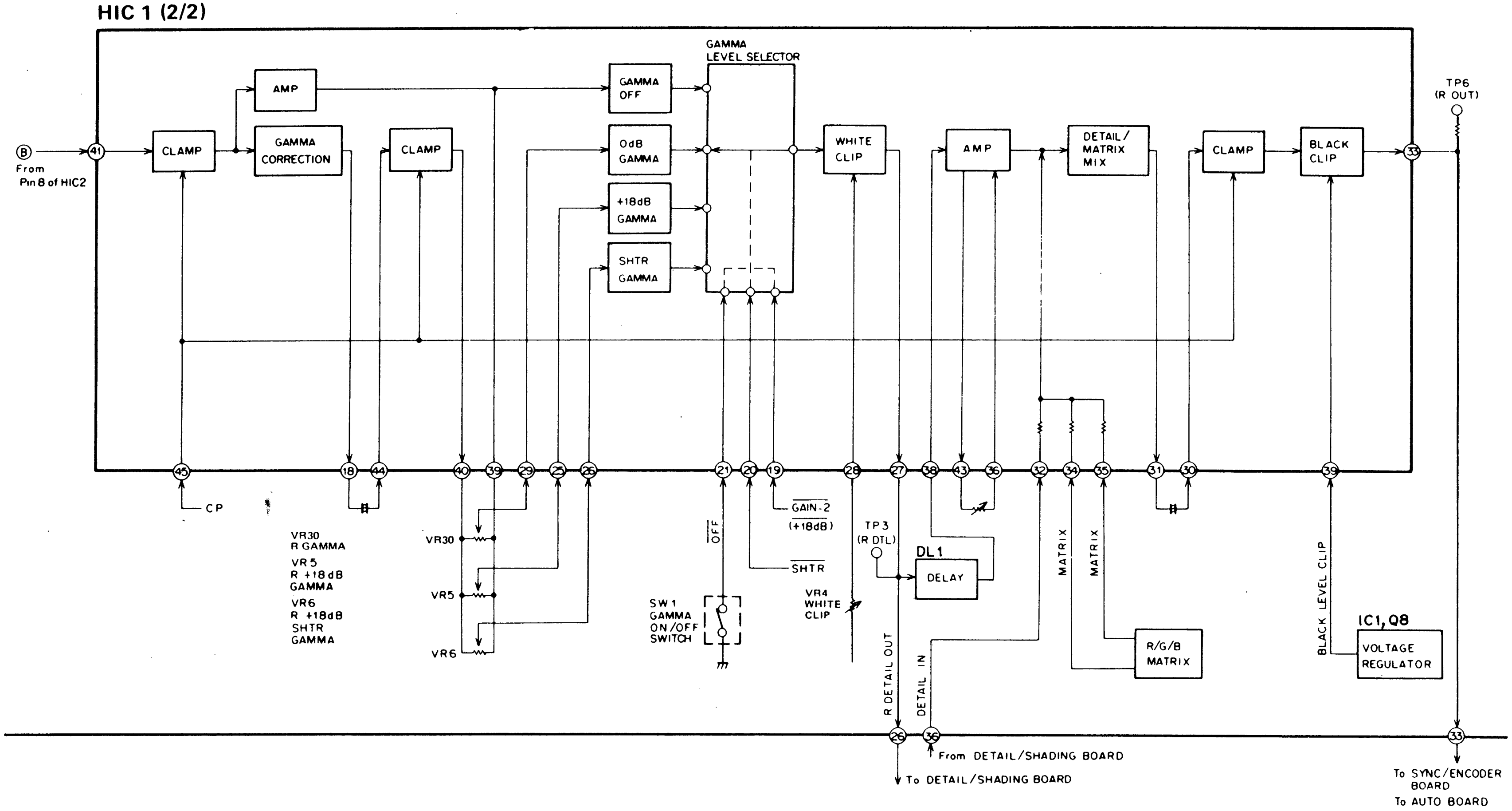

HIC 1 (2/2)
B
From Pin 8 of HIC2
41
CLAMP
AMP
GAMMA CORRECTION
CLAMP
GAMMA OFF
0dB GAMMA
+18dB GAMMA
SHTR GAMMA
GAMMA LEVEL SELECTOR
WHITE CLIP
AMP
DETAIL/ MATRIX MIX
CLAMP
BLACK CLIP
33
TP6 (R OUT)
45
18
44
40
39
29
25
26
21
20
19
28
27
38
43
36
32
34
35
31
30
39
CP
VR30 R GAMMA
VR5 R +18dB GAMMA
VR6 R +18dB SHTR GAMMA
VR30
VR5
VR6
OFF
SW1 GAMMA ON/OFF SWITCH
SHTR
GAIN-2
(+18dB)
TP3 (R DTL)
VR4 WHITE CLIP
DL1
DELAY
MATRIX
MATRIX
R/G/B MATRIX
BLACK LEVEL CLIP
IC1, Q8
VOLTAGE REGULATOR
R DETAIL OUT
DETAIL IN
26
36
33
From DETAIL/SHADING BOARD
To DETAIL/SHADING BOARD
To SYNC/ENCODER BOARD
To AUTO BOARD

Fig. 5-2 Block Diagram of HIC1 (2/2)

5-1-3 R Process Circuit -3 in HIC2

The R signal obtained at pin47 of HIC1 is fed to pin3 of HIC2. (Refer to Fig. 5-3)
This circuit receives the R signal and controls the R knee point and R knee slope.
The R knee point is controlled by adjusting VR1 (R KNEE POINT) on the HIC2.
The R knee slope is controlled by adjusting VR2 (R KNEE SLOPE) on the HIC2.
VR3 on the HIC2 sets the reference voltage of this circuit.
The R signal thus obtained at pin9 of HIC2 is sent to R process circuit-2 in HIC1 through pin41 HIC1 .

5-1-4 G Process Circuit -1

The G signal obtained at pin12 of CN1 is fed to the following circuit in HIC3 through pin57 of HIC3 to the following circuit in HIC3.

- Shading Correction/Pulse Cancel Circuit

The G dark shading correction signal and G pulse cancel DC voltage are supplied to shading/pulse cancel selection switch in HIC3 to be selected using horizontal drive (HD) pulse. And the selected signal is sent to the shading correction/pulse cancel circuit in order to match the G pedestal level between 0dB and +18dB when the Auto White/Auto Black Set Switch on the front of the camera is set to the ABC position.
The G pulse cancel DC level is controlled by VR23 (G PULSE CANCEL).

- Flare Compensation Circuit

The G signal is sent through VR9 (G FLARE GAIN) to this circuit and converted into DC voltage corresponding to the G signal level.
VR10 (G FLARE OFFSET) is a control for the offset DC voltage in order to match the compensation value to the G black level variation. The DC voltage is sent to analog switch controlled by the preblanking (PBL) pulse.

- High Gain Control/Gain Control Circuit

This circuit controls the level of the G signal by changing the gain of circuit when the camera gain is selected to −6dB, 0dB, +3dB, +9dB, +12dB or +18dB position by setting the High Gain Selection switch and −6dB ON/OFF switch.

- Pedestal Control Circuit

This circuit controls the pedestal level of the G signal by adjusting VR28 (G PEDESTAL LEVEL).

- Video Amplifier Circuit

The G video signal is sent to HIC2 through this circuit.

- NAM (non-additive mixing) Video Amplifier Circuit

This circuit sends NAM(non-additive mixing) video signal to the lens control circuit on the Power/ALC board in order to control the lens iris automatically.

5-1-5 G Process Circuit-2

The G signal obtained at pin9 of HIC4 is returned to HIC3 through pin41 of HIC3. And the G signal is fed to the following circuit in HIC3.

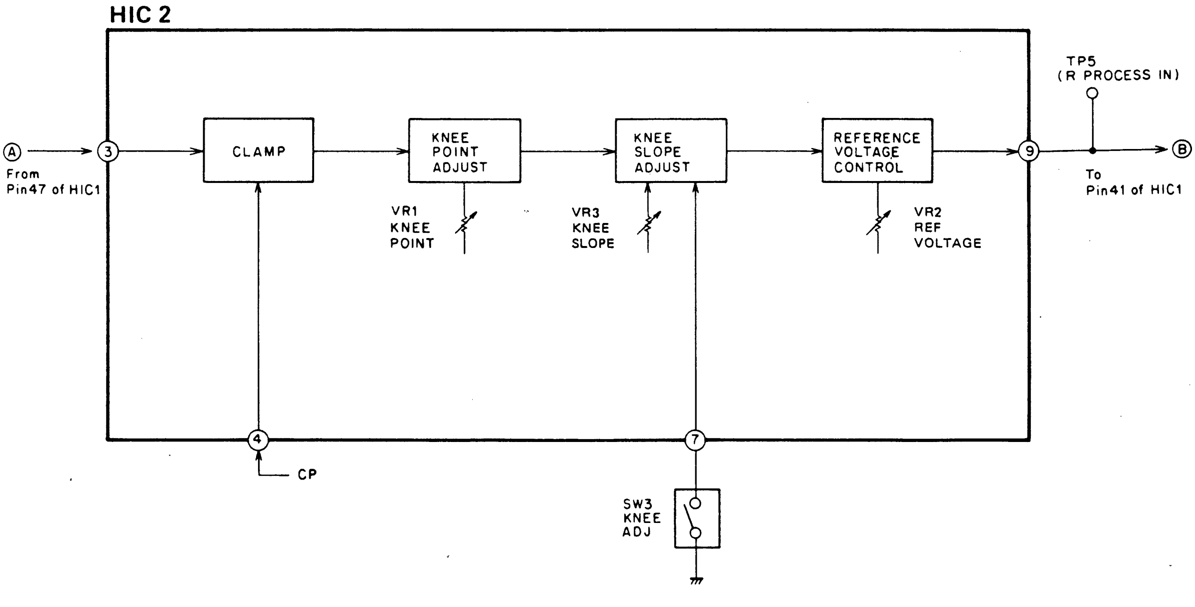


Fig. 5-3 Block Diagram of HIC2

- Gamma Correction

The fine gamma corrected G signal is fed to VR31 (G GAMMA) through pin40 of HIC3. On the other hand, linear G signal is also supplied to VR31 (G GAMMA) through pin 39 of HIC3. Then the gamma corrected G signal and the linear G signal are mixed at VR31 which sets the gamma correction characteristic to approximate 0.45.

When the High Gain Selection Switch on the side of camera is set to +18dB (Gain-2) position or shutter ON/OFF Switch on the side of camera is set to ON position, the G signal is corrected by VR12 (G +18dB GAMMA) or VR13 (G +18dB SHTR GAMMA) and these corrected signals are sent to Gamma Level Selector (digitally controlled analog switch).

The G signal is selected by Gamma Level Selector using GAIN-2 (+18dB) and SHTR signals. These control signals are fed to pin19 and pin20 of HIC3 respectively.

The Gamma ON/OFF Switch on the Process board is used for the gamma correction adjustment. When the Gamma ON/OFF Switch on the Process board is set to OFF position, the linear G signal is selected by Gamma Level Selector and sent to the white clip circuit in HIC3. And this linear G signal is used for adjustment of the Gain-2 (+18dB) and Shutter mode gamma correction.

The Gamma ON/OFF Switch on the Process board is set to ON position normally.

Thus the gamma corrected G signal corrected the gamma is sent to the white clip circuit in HIC3.

- White Clip Circuit

This circuit clips the high level on the G signal by adjustment VR11 (G WHITE CLIP).

And the clipped G signal is sent to the Detail/Shading board and Delay line DL2 respectively in order to make the aperture signal.

- Detail/Matrix Mix Circuit

The G signal sent from white clip circuit in HIC3 is fed to Detail/Matrix circuit in HIC3.

In this circuit the G signal is mixed with (G-R) signal, (G-B) signal from R/G/B matrix circuit and aperture signal from Detail/Shading board.

- Clamp/Black Clip Circuit

The G signal sent from Detail/Matrix circuit in HIC3 is fed to the clamp circuit through pin30 of HIC3 where the blanking pried of G signal is clipped by the clamp pulse supplied to pin45 of HIC3.

The G signal is then fed to black clip circuit where its low level is clipped for setting the pedestal level.

Then the G signal is sent to the Sync/Encoder board and the Auto board through pin33 of HIC3 and pin33 of the Process board.

5-1-6 G Process Circuit -3 in HIC4

The G signal obtained at pin47 of HIC3 is fed to pin3 of HIC4.

This circuit receives the G signal and controls the G knee point and G knee slope.

The G knee point is controlled by adjusting VR1 (R KNEE POINT) on the HIC4.

The G knee slope is controlled by adjusting VR2 (R KNEE SLOPE) on the HIC4.

VR3 on the HIC4 sets the reference voltage of this circuit.

The G signal thus obtained at pin9 of HIC4 is sent to G process circuit-2 in HIC3 through pin41 of HIC3.

5-1-7 B Process Circuit -1

The B signal obtained at pin18 of CN1 is fed to the following circuit in HIC5 through pin57 of HIC5 .

- Shading Correction/Pulse Cancel Circuit

The B dark shading correction signal and B pulse cancel DC voltage are supplied to shading/pulse cancel selection switch in HIC5 to be selected using horizontal drive (HD) pulse. And the selected signal is sent to the shading correction/pulse cancel circuit in order to match the B pedestal level between 0dB and +18dB when the Auto White/Auto Black Set Switch on the front of the camera is set to the ABC position.

The B pulse cancel DC level is controlled by VR25 (B PULSE CANCEL).

- Flare Compensation Circuit

The B signal is sent through VR15 (B FLARE GAIN) to this circuit and converted into DC voltage corresponding to the B signal level.

VR16 (B FLARE OFFSET) is a control for the offset DC voltage in order to match the compensation value to the B black level variation. The DC voltage is sent to analog switch controlled by the preblanking (PBL) pulse.

- High Gain Control/Gain Control Circuit

This circuit controls the level of the B signal by changing the gain of circuit when the camera gain is selected to -6dB, 0dB, +3dB, +9dB, +12dB or +18dB position by setting the High Gain Selection switch and -6dB ON/OFF switch.

- Pedestal Control Circuit

This circuit controls the pedestal level of the B signal by adjusting VR29 (B PEDESTAL LEVEL). Setting to the RCU operation mode, the pedestal control DC from RCU is fed through B Pedestal Level CAM/RCU Select IC10 (c) on the Mother board to pin5 of CN1 on the Process board. The pedestal control DC from the Auto board or RCU is selected by this analog switch IC10 (c) using RCU/CAM selection signal.

- Video Amplifier Circuit

The B video signal is sent to HIC2 through this circuit.

- NAM (non-additive mixing) Video Amplifier Circuit

This circuit sends NAM(non-additive mixing) video signal to the lens control circuit on the Power/ALC board in order to control the lens iris automatically.

5-1-8 B Process Circuit-2

The B signal obtained at pin9 of HIC6 is returned to HIC5 through pin41 of HIC5. And the B signal is fed to the following circuit in HIC5.

- Gamma Correction

The fine gamma corrected B signal is fed to VR32 (B GAMMA) through pin40 of HIC5. On the other hand, linear B signal is also supplied to VR32 (B GAMMA) through pin 39 of HIC5. Then the gamma corrected B signal and the linear B signal are mixed at VR17 which sets the gamma correction characteristic to approximate 0.45.

When the High Gain Selection Switch on the side of camera is set to +18dB (Gain-2) position or shutter ON/OFF Switch on the side of camera is set to ON position, the B signal is corrected by VR18 (B +18dB GAMMA) or VR19 (B +18dB SHTR GAMMA) and these corrected signals are sent to Gamma Level Selector (digitally controlled analog switches).

The the B signal corrected the gamma is selected by Gamma Level Selector using GAIN-2 (+18dB) and SHTR signals. These control signals are fed to pin19 and pin20 of HIC5 respectively.

The Gamma ON/OFF Switch on the Process board is used for the gamma correction adjustment. When the Gamma ON/OFF Switch on the Process board is set to OFF position, the linear B signal is selected by Gamma Level Selector and sent to the white clip circuit in HIC5. And this linear B signal is used for adjustment of the Gain-2 (+18dB) and Shutter mode gamma correction.

The Gamma ON/OFF Switch on the Process board is set to ON position normally.

Thus the gamma corrected B signal is sent to the white clip circuit in HIC5.

- White Clip Circuit

This circuit clips the high level on the B signal by adjusting VR17 (B WHITE CLIP).

And the clipped B signal is sent to the Detail/Shading board and Delay line DL1 respectively in order to make the aperture signal.

- Detail/Matrix Mix Circuit

The B signal sent from white clip circuit in HIC5 is fed to Detail/Matrix circuit in HIC5 through Delay Line DL3 and VR20 (B GAIN) on the Process board. In this circuit the B signal is mixed with (B-G) signal, (B-R) signal from R/G/B matrix circuit and aperture signal from Detail/Shading board.

- Clamp/Black Clip Circuit

The B signal sent from Detail/Matrix circuit in HIC5 is fed through pin30 of HIC5 to the clamp circuit where the blanking pried of B signal is clipped by the clamp pulse which is supplied to pin45 of HIC5.

The B signal is then fed to black clip circuit where its low level is clipped by setting the pedestal level.

Then the B signal is sent to the Sync/Encoder board and the Auto board through pin33 of HIC5 and pin33 of the Process board.

5-1-9 B Process Circuit -3 in HIC6

The B signal obtained at pin47 of HIC5 is fed to pin3 of HIC6.

This circuit receives the B signal and controls the B knee point and B knee slope.

The B knee point is controlled by adjusting VR1 (R KNEE POINT) on the HIC6.

The B knee slope is controlled by adjusting VR2 (R KNEE SLOPE) on the HIC6.

VR3 on the HIC6 sets the reference voltage of this circuit.

The B signal thus obtained at pin9 of HIC6 is sent to B process circuit-2 in HIC5 through pin41 HIC5 .

5-2 R.G.B. Matrix Circuit

This circuit is a color reproduction fine adjusting circuit for color matching between two or more cameras.

When SW2 (MATRIX ON/OFF SWITCH) is set to the ON position, the differential amplifier consisting of Q10, Q11, Q15, Q16, Q20 and Q21 are working by switching transistors Q9, Q12, Q17 and Q22.

The R signal is sent from the emitter of Q1 to the base of Q15 and Q21. The G signal is sent from the emitter of Q2 to the base of Q10 and Q16. The B signal is sent from the emitter of Q3 to the base of Q11 and Q20 respectively,. Then the (B-G) signal is generated by Q10, Q11 and mixed with the B signal at Matrix mix circuit in HIC5 through buffer Q13 and pin34 HIC5. The (G-B) signal generated by Q10, Q11 is mixed with the G signal at Matrix mix circuit in HIC3 through buffer Q14 and pin34 of HIC3.

The (G-R) signal is generated by Q15, Q16 and mixed with the G signal at Matrix mix circuit in HIC3 through VR39 (R-Y MATRIX), buffer Q18 and pin35 of HIC3. The (G-R) signal generated by Q15, Q16 is mixed with the R signal at Matrix mix circuit in HIC1 through buffer Q19 and pin of HIC1.

The (R-B) signal is generated by Q20, Q21 and mixed with the R signal at Matrix circuit in HIC1 through VR40 (B-Y MATRIX), butter Q23 and pin35 of HIC1. The (B-R) signal generated by Q20, Q21 is with the B signal at Matrix mix circuit in HIC5 through buffer Q24 and pin35 of HIC5.

5-3 R.G.B. Gain-2 (+ 18dB)/ Shutter Flare Control Circuit

5-3-1 R Gain-2(18dB)/Shutter Flare Control Circuit

This circuit controls the R flare gain and R flare offset adjustment when the High Gain Selection Switch is set to + 18dB position and the Shutter ON/OFF Switch is set to ON position respectively.
The DC voltage adjustment VR34 (R + 18dB SHTR FLARE) is sent to flare amplifier circuit in HIC1 through pin54 of HIC1 from this circuit. This circuit is composed of IC3 (a), Q25-Q27 and Q28. The offset DC voltage sent to flare amplifier is adjustment by VR33 (R UP/SHTR POS).
When the High Gain Selection Switch is set to + 18dB position and the Shutter ON/OFF Switch is to ON position, the DC voltage adjusted by VR34 is sent to pin54 of HIC1.

5-3-2 G Gain-2(+ 18dB)/Shutter Flare Control Circuit

This circuit controls the G flare gain and G flare offset adjustment when the High Gain Selection Switch is set to + 18dB position and the Shutter ON/OFF Switch is set to ON position respectively.
The DC voltage adjustment VR36 (G + 18dB SHTR FLARE) is sent to flare amplifier circuit in HIC3 through pin54 of HIC3 from this circuit. This circuit is composed of IC3 (b), Q29-Q31 and Q32. The offset DC voltage sent to flare amplifier is adjustment by VR35 (G UP/SHTR POS).
When the High Gain Selection Switch is set to + 18dB position and the Shutter ON/OFF Switch is to ON position, the DC voltage adjusted by VR36 is sent to pin54 of HIC3.

5-3-3 B Gain-2(+ 18dB)/Shutter Flare Control Circuit

This circuit controls the B flare gain and B flare offset adjustment when the High Gain Selection Switch is set to + 18dB position and the Shutter ON/OFF Switch is set to ON position respectively.
The DC voltage adjustment VR38 (B + 18dB SHTR FLARE) is sent to flare amplifier circuit in HIC5 through pin54 of HIC5 from this circuit. This circuit is composed of IC3 (c), Q33-Q35 and Q36. The offset of DC voltage sent to flare amplifier is adjustment by VR37 (R UP/SHTR POS).
When the High Gain Selection Switch is set to + 18dB position and the Shutter ON/OFF Switch is to ON position, the DC voltage adjusted by VR38 is sent to pin54 of HIC5.

6. Detail/Shading Board

6-1 Phase Locked Loop (PLL) Circuit
6-2 1H Delay G Signal Generator Circuit
6-3 2H Delay G Signal Generator Circuit
6-4 Aperture Signal Generator Circuit
6-5 Level Dependent Control Circuit
6-6 Detail Signal Output Circuit
6-7 Dark Shading Correction Generator Circuit
6-8 + 9V Regulator Circuit

6-1 Phase Locked Loop (PLL) Circuit

This circuit generates 21MHz clock pulse signal for 1H-delay CCD whose phase coincides with HD pulse from Sync board.
Approx. 21MHz pulse generated by voltage controlled oscillator (VCO) consisting of IC5 (a), L2, CT1 (PLL LOCK), C6, C7 and variable capacitance diode D6 is supplied to pin14 of 1H-delay CCD IC7 and IC10 through IC13(d).
This clock pulse is also fed through IC5 (b) to pin10 of IC2. The horizontal rate pulse obtained at pin15 of IC2 is sent to pin 8 of phase detector IC4.
On the other hand, HD pulse from the Sync/Encoder board is supplied to pin 7 of IC4 through pin41 of CN1 as a reference signal.
The DC voltage corresponding to the phase error between HD and horizontal rate pulse is obtained at pin3 of IC4 and is fed to VCO through pins 2 and 1 of IC4 to control the phase (21MHz frequency) of oscillator by changing the capacitance of D6. This phase locked loop (PLL) circuit is stabilized, the 21MHz clock pulse synchronized with the HD signal is generated.

6-2 1H Delay G Signal Generator Circuit

This circuit receives the G signal from the Process board and generates 1H delayed G signal in order to make the detail signal.
The G signal from the Process board is sent to amplifiers Q4~Q6 through pin17 of CN1 and bypass switch SW1. The level t of G signal is adjusted by VR3 (1H CCD D RANGE).
The G signal through VR3 and pin1of IC6(a) is obtained at pin15 of IC6(a).
When the Auto White/Auto Black Set Switch is set to AWC position, the AWC Busy signal from the Auto board is fed to pin10 of analog switch IC6 through pin19 of CN1 and AWC signal amplifier Q52, Q63.
The G signal supplied to pin2 of is obtained at pin 15 of IC6.
The amplified G signal obtained at pin15 of IC6 is sent through buffer Q7 to the low pass filter (LPF) CF1 in order to remove the noise. The G signal obtained at the output of LPF is fed to the clamp circuit Q9 through amplifier Q53, Q54 and Q8 where the G signal is clamped by H CP pulse supplied to the base of Q9. The clamped G signal is sent to pin12 of analog switch IC6 through buffers Q10 and Q11.

On the other hand, the HD pulse is fed to monostable multivibroator IC14 (a) through IC13(a) to make the sync signal. The sync signal is then sent to the control terminal (pin11) of analog switch IC6 and the sync signal is formed on the blanking period of the G signal. The sync level is controlled by VR4 1H (SYNC LEVEL).

The G signal with sync signal obtained at pin14 of IC6 is supplied to pins 4 and 21 of 1H delay IC7 through buffer Q12.

The G signal is modulated by 21MHz clock pulse supplied to pin14 of IC5 and is then delayed 1H period.

The DC bias of the 1H delay CCD is controlled by VR5 (1H V_{GG}-1) and VR6 (1H V_{GG}-2) control.

The modulated 1H delayed G signal obtained at pin1 of IC7 is fed through buffer Q13 to low pass filter (L.P.F) CF2 to remove the 21MHz carrier component.

The 1H delayed G signal is then sent to the gain control circuit consisting of Q14, Q15, VR7 (1H output GAIN-1) and VR8 (1H output GAIN-1).

The 1H delayed G signal obtained at the collector of Q15 is supplied to the clamp circuit consisting of Q17 where the 1H delayed G signal is clamped by H. CP pulse. The 1H delayed G signal is also fed to the 2H delay signal generator circuit.

The clamped 1H delayed G signal is sent to the black clip circuit consisting of Q18~Q20 to remove the sync signal, and it is supplied to the aperture circuit and level dependent control circuit through buffer Q21.

6-3 2H Delay Signal Generator Circuit

This circuit receives 1H delayed G signal and generates 2H delayed G signal as in case of 1H delay signal generator circuit.

The 1H delayed G signal from the 1H delay signal generator circuit is sent to pin13 of analog switch IC9 through amplifiers Q23~Q25. The level of 1H delayed G signal is adjusted by VR10 (2H CCD RANGE).

The 1H delayed G signal through VR10 and pin13 of IC 9(C) is obtained at pin14 of IC 9(C).

When the Auto White/Auto Black Set Switch is set to the AWC position, the AWC Busy signal from the Auto board is fed to pin11 of analog switch IC9.

The amplified 1H delayed G signal obtained at pin14 of IC9 is supplied to pins 4 and 21 of 1H delay CCD IC10 through capacitors C41 and C40 respectively.

The 1H delayed G signal is modulated by 21MHz clock pulse supplied to pin14 of IC10 from pin6 of IC5(c) and then delayed 1H period more (total 2H). The DC bias of the 1H delay CCD is controlled by VR11 (2H V_{GG}-1) and VR12 (2H V_{GG}-2).

The modulated 2H delayed G signal obtained at pin1 of IC10 is fed buffer Q26 to low pass filter (L.P.F.) CF3 to remove the 21MHz carrier component.

The 2H delayed G signal is sent to the gain control circuit consisting of Q27, Q28, VR13 (2H OUTPUT GAIN-1) and VR14 (2H OUTPUT GAIN-2).

The 2H delayed G signal obtained at the collector of Q28 is supplied to the clamp circuit Q30 where the 2H delayed G signal is clamped by H.CP pulse. The clamped 2H delayed G remove the sync signal, and it is supplied to the aperture signal generator circuit.

6-4 Aperture Signal Generator Circuit

This circuit generates V. aperture signal for enhancing the V Resolution by mixing of non-delayed G signal (0H), 1H delayed G signal (1H) and 2H delayed G signal (2H) and generates H. aperture signal to enhance the H resolution as well.

- V Aperture Signal Generator Circuit

The non-delayed G signal is supplied to the emitter of amplifier Q35 through pin 17 of CN1, bypass switch SW1 and R153/C158. On the other hand, the 2H delayed G signal is fed to the emitter of Q35 through R152/C157. They are mixed at the emitter of Q35. The mixed G signal is then sent through amplifier Q35 and butter Q36 to the emitter of amplifier Q37 where it is mixed with the 1H delayed G signal supplied to the base of Q37. As a result, V aperture signal is obtained at the collector of Q37.

VR18 (V.APERTURE BAL) is a control for minimizing the video signal and obtaining only the V.aperture signal.

The V.aperture signal from the collector of Q37 is supplied to the level dependent control circuit through VR19 (V.APERTURE GAIN) and buffer Q38.

VR19 (V.APERTURE) is a control for the V. aperture signal level.

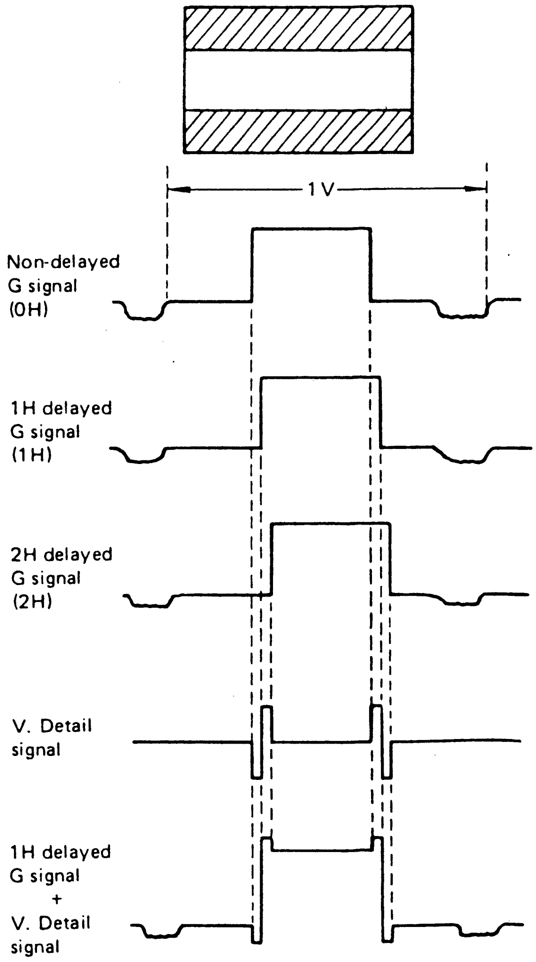


Fig. 6-1 V Aperture Signal Generator Circuit

- H. Aperture Signal Generator Circuit

This circuit generates H. detail signal to enhance the H resolution.

The R signal from pin13 of CN1, B signal from pin21 of CN1, non-delayed G signal from pin17 of CN1 and 1H delayed G signal from Q21 are mixed at the base of Q39 to consist a comb filter.

The comb filter removes harmonics to reduce the cross-color noise. When the camera is aimed at an object (A) for example, the mixed signal (B) is obtained at the emitter of Q39. This signal is delayed by DL4 to generate pulse (C). This pulse is differentiated again by CF5 and as a result, H. detail signal (D) is generated as the Detail Frequency Band Selection Switch is set to HIGH position.

When the Detail Frequency Band Selection Switch is set to LOW Position, the H. detail signal is supplied to buffer Q42 through Q62 and Q61.

Then analog switches IC16 and IC17 select the signal line to Q62 or Q55.

The H. detail signal is then supplied through inverter Q61 and buffer Q42 to the level dependent control circuit.

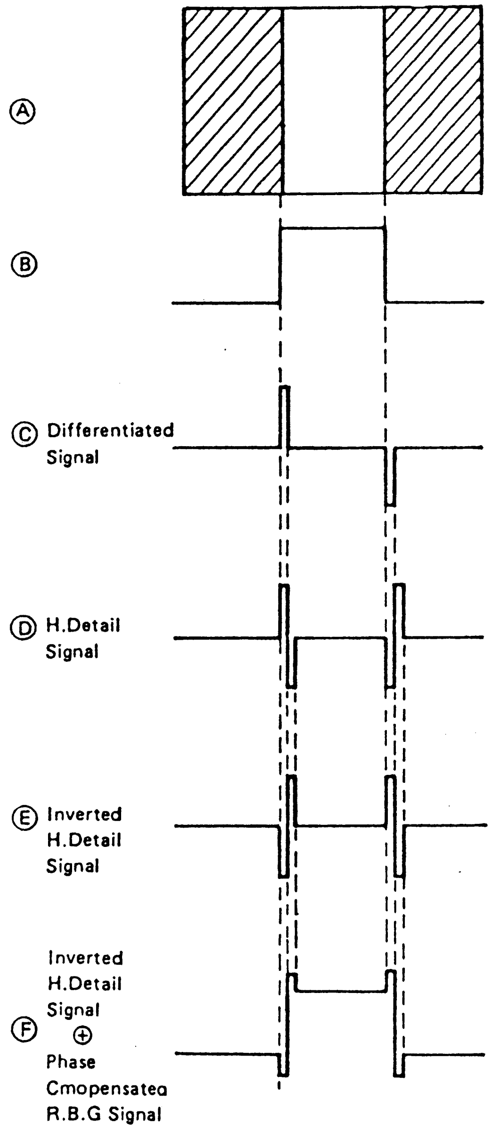

Ⓐ
Ⓑ
Ⓒ Differentiated Signal
Ⓓ H.Detail Signal
Ⓔ Inverted H.Detail Signal
Ⓕ Inverted H.Detail Signal ⊕ Phase Cmopensateo R.B.G Signal

Fig. 6-2 H. Detail Signal

6-5 Level Dependent Control Circuit

This circuit generates the detail signal corresponding to the level of G signal and sends them to the detail signal output circuit.

The 1H delay G signal from the emitter of Q21 is supplied to level dependent circuit consisting of Q45 and Q46. When the 1H delay G signal becomes lower than specified level set by VR23 (LEVEL DEPENDENT), Q46 is turned ON and G signal is sent to the H and V aperture mix circuit consisting of Q47 and IC11 to turn ON Q47.

By this way, the detail signal in dark picture areas is removed.

In addition, while H. blanking period, composite preblanking pulse is supplied to the base of Q45, thus, Q46 OFF and Q45 ON, therefore, the noise during the blanking period is removed.

When the High Gain Selection Switch on the side of the camera is set to the + 18dB (Gain-2) position, Q44 is turned ON and the specified level is set by VR24 (GAIN-2 LEVEL DEPENDENT).

The DTL LEVEL Switch on the side of the camera is set to OFF position, the low level is supplied to the base of Q43 for turning it ON. As a result, no signal is supplied to the H and V aperture mix circuit.

The V. aperture signal from Q38 and H. aperture signal from Q42 is sent to the drain and source of Q47 respectively and they are mixed at amplifier IC11.

The detail signal obtained at pin5 of IC11 is fed to the detail output circuit.

6-6 Detail Signal Output Circuit

The detail signal is fed to the noise coring circuit to minimize noise on the detail signal.

The detail signal (A) which contains the noise is fed to D3 and D4. The center (noise) portion of the detail signal is suppressed by threshold level of D3 and D4 (B).

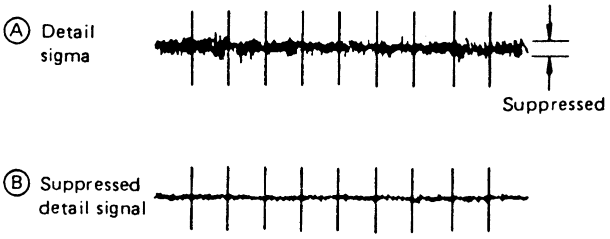


Fig. 6-3 Noise Suppression

When the High Gain Selection Switch on the Side Switch board is set to 0dB position, potential at gate of Q49 and Q50 is low level for turning them OFF and the noise suppress level at 0dB position is controlled by VR27 (NOISE SUPPRESS).

When the High Gain Selection Switch is set to +9dB (Gain-1) position, the low (L) level is supplied to the control terminal (pin9) of analog switch IC12 and pins 5 and 4 of IC12 are connected. As a result, +4.5V DC which is generated by IC8 (b) is sent to the gate of Q50 to turn it ON. There fore VR26 (GAIN-1 NOISE SUPPRESS) is parallelly connected to VR27 and the noise suppress level at +9dB position is finely adjusted by VR26.

When the High Gain Selection Switch is set to +18dB position, the low (L) level is fed to the control terminal (pin 10) of IC2 through pin15 of CN1 and D9 , and pins 2 and 15 are connected. As a result, +4.5V DC is sent to the gate of Q49 and it is turned ON. Therefore VR25 (GAIN-2 NOISE SUPPRESS) is parallelly connected to VR27 and the noise suppress level at +18dB is adjusted by VR25.

The noise suppressed detail signal is then supplied to VR28 (TOTAL APERTURE) through C81. When the Detail Level Selection Switch is set to DTL HIGH position, the low (L) level is fed to the control terminal (pin11) of analog switch IC12 . On the other hand, when the Detail Level Selection Switch is set to DTL Low position, the high (H) level is sent to the control terminal (pin11) of IC12 through pin25 of CN1 and pins 13 and 14 of IC12 are connected. As a result, the detail gain is controlled by the position of the Detail Level Selection Switch.

The detail signal obtained at pin14 of IC12 is fed to the Process board through buffer Q51 and pin26 of CN1.

6-7 Dark Shading Correction Signal Generator Circuit

This circuit is included in Hybrid IC and generates the dark shading correction signal which flattens the dark signal waveform of R.G and B signals.(Refer to Fig. 6-1)

- H Sawtooth Generator Circuit

The horizontal drive (HD) pulse from the Sync/Encoder board is fed to this circuit through pin41 of CN1 and pin29 of IC19.

The H sawtooth signal is then supplied to H shading correction controls VR7 (R H. SAWTOOTH), VR8 (G H.SAWTOOTH), VR9 (B H.SAWTOOTH) respectively.

- V Sawtooth Generator Circuit

The vertical drive (VD) pulse from the Sync/Encoder board is fed to this circuit also through pin40 of CN1 and pin9 of IC19.

The V sawtooth signal is then supplied to V shading correction controls VR4 (R V. SAWTOOTH), VR5(G V.SAWTOOTH), VR6 (B V. SAWTOOTH) respectively.

- Sawtooth Top Voltage Control Circuit

This circuit generates signals to control the sawtooth waveforms.

VR1 (R V.TOP), VR2(G V.TOP) and VR3 (B V. TOP) controls the top of sawtooth waveforms to mix these control signal with R.G.B sawtooth waveforms respectively.

- R.G.B Shading Signal Drive Circuit

The H, V sawtooth signals and Sawtooth Top are mixed and supplied to R.G.B shading signal drive circuit respectively.

These dark shading correction signals are sent to the Process board.

6-8 +9V Regulator Circuit

This +9V regulator circuit is composed of IC8 (a) and Q22.

The +9V DC voltage generated by this circuit from +9.2V DC voltage is supplied to each circuits in Detail/Shading board.

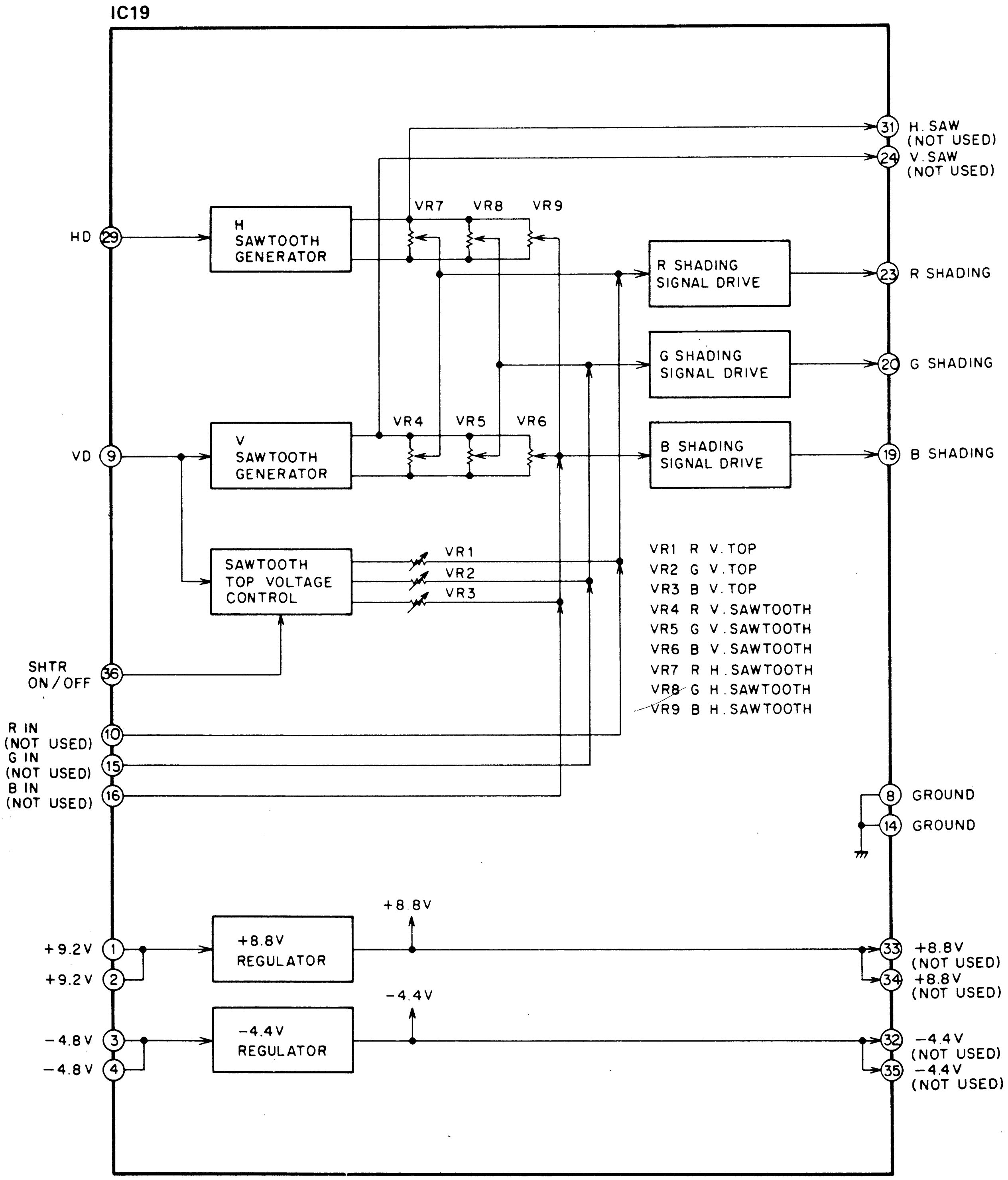

IC19
H.SAW (NOT USED)
V.SAW (NOT USED)
HD 29
H SAWTOOTH GENERATOR
VR7
VR8
VR9
R SHADING SIGNAL DRIVE
23 R SHADING
G SHADING SIGNAL DRIVE
20 G SHADING
B SHADING SIGNAL DRIVE
19 B SHADING
31
24
VR4
VR5
VR6
VD 9
V SAWTOOTH GENERATOR
SAWTOOTH TOP VOLTAGE CONTROL
VR1
VR2
VR3
VR1 R V.TOP
VR2 G V.TOP
VR3 B V.TOP
VR4 R V.SAWTOOTH
VR5 G V.SAWTOOTH
VR6 B V.SAWTOOTH
VR7 R H.SAWTOOTH
VR8 G H.SAWTOOTH
VR9 B H.SAWTOOTH
SHTR ON/OFF 36
R IN (NOT USED) 10
G IN (NOT USED) 15
B IN (NOT USED) 16
8 GROUND
14 GROUND
+8.8V
+9.2V 1
+9.2V 2
+8.8V REGULATOR
33 +8.8V (NOT USED)
34 +8.8V (NOT USED)
-4.4V
-4.8V 3
-4.8V 4
-4.4V REGULATOR
32 -4.4V (NOT USED)
35 -4.4V (NOT USED)

Fig. 6-1 Block Diagram of IC19

7. Power/ALC Board

7-1 + 9.2V/ + 15.5V Regulator Circuit

This circuit generates regulated + 9.2V DC and + 15.5V DC from unregulated + 12V DC power by using switching pulse generated inside IC1 and they are supplied to other circuits.
The voltage fluctuation of + 9.2V DC and + 15.5V DC are supplied through pins 14 and 3 to respective error amplifiers inside IC1, where they are compared with reference voltage. The comparison outputs are then supplied to comparator, where they are compared with triangle pulse supplied from pin 1. As a result, width of switching obtained at pins 10 and 7 are controlled so that both + 9.2V DC and + 15.5V DC are kept constant.

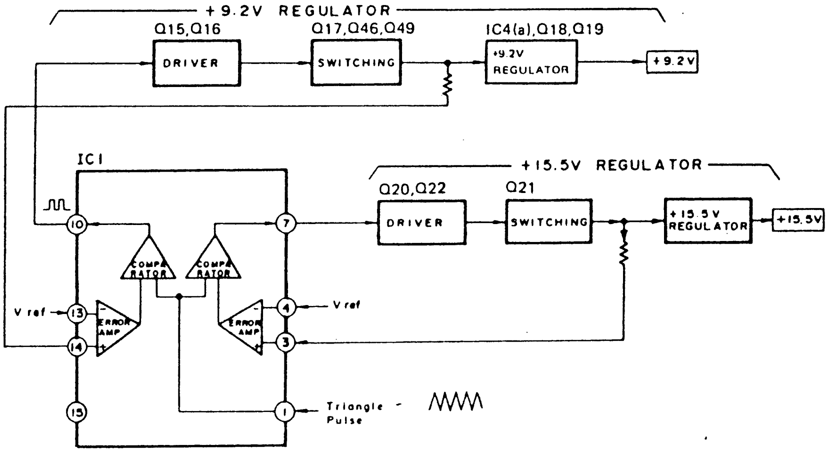

+9.2V REGULATOR
Q15,Q16
Q17,Q46,Q49
IC4(a),Q18,Q19
DRIVER
SWITCHING
+9.2V REGULATOR
+9.2V
IC1
+15.5V REGULATOR
Q20,Q22
Q21
DRIVER
SWITCHING
+15.5V REGULATOR
+15.5V
10
7
COMPARATOR
COMPARATOR
V ref
13
14
ERROR AMP
ERROR AMP
4
V ref
3
15
1
Triangle Pulse

Fig. 7-1 + 9.2V/ + 15.5V Regulator Circuit

7-2 + 5.1V/ – 4.8V Regulator Circuit

This circuit generates regulated + 5.1V DC and – 4.8V DC from unregulated + 12V DC power by using switching pulse generated inside IC2 and they are supplied to other circuits.
The voltage fluctuation of + 5.1V DC and – 4.8V DC are supplied through pins 14 and 4 to respective error amplifiers inside IC2, where they are compared with reference voltage set by VR1. The comparison outputs are then supplied to comparator, where they are compared with triangle pulse. As a result, width of switching pulses obtained at pins 10 and 7 are controlled so that both + 5.1V DC and – 4.8V DC are kept constant.

- Triangle OSC Synchronizer

Triangle pulse is synchronized with horizontal drive (HD) pulse supplied from pin 41 of CN1 by adjusting VR2.

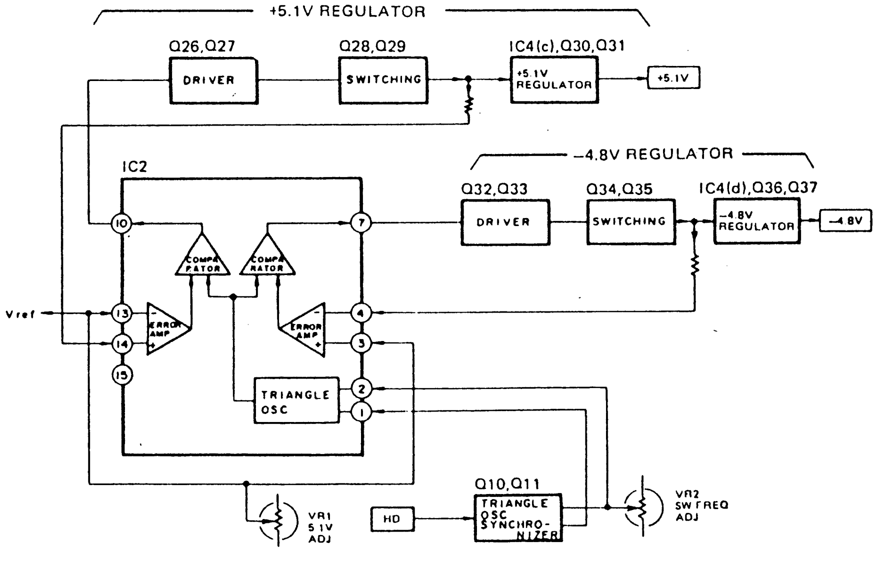

+5.1V REGULATOR
Q26,Q27
Q28,Q29
IC4(c),Q30,Q31
DRIVER
SWITCHING
+5.1V REGULATOR
+5.1V
IC2
-4.8V REGULATOR
Q32,Q33
Q34,Q35
IC4(d),Q36,Q37
DRIVER
SWITCHING
-4.8V REGULATOR
-4.8V
10
7
COMPARATOR
COMPARATOR
Vref
13
14
15
ERROR AMP
ERROR AMP
4
3
2
1
TRIANGLE OSC
Q10,Q11
TRIANGLE OSC SYNCHRONIZER
HD
VR1 5.1V ADJ
VR2 SW FREQ ADJ

Fig. 7-2 + 5.1V/ – 4.8V Regulator Circuit

7-3 – 8.3V Regulator Circuit

This circuit generates regulated – 8.3V DC from unregulated + 12V DC power by using switching pulse generated inside IC3 and it is supplied to other circuits.

The voltage fluctuation of – 8.3V DC is supplied through pins 3 to respective error amplifier inside IC3, where it is compared with reference voltage set by VR1. The comparison outputs are then supplied to comparator, where they are compared with triangle pulse. As a result, width of switching pulses come out from pins 7 is controlled so that – 8.3V DC is kept constant.

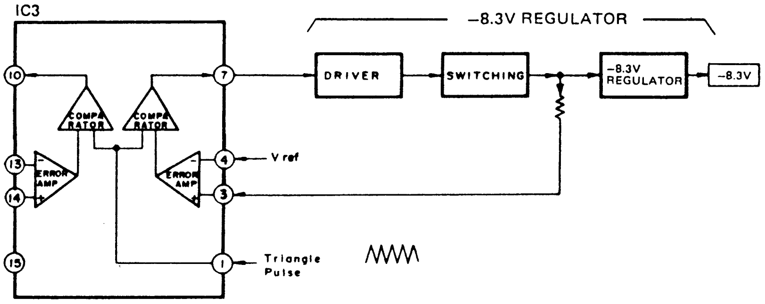


Fig. 7-3 – 8.3V Regulator Circuit

7-4 Standby Control Circuit

When Power Switch of camera is set to the save mode, standby control signal is supplied to pin15 of IC1 through standby control Q1-Q3, IC6 (b), Q51 and standby detect Q8 . And standby control signal is supplied to pin15 of IC2 and IC3 respectively through standby Q9, Q14 .

Then IC1-IC3 becomes inactive mode. As a result, + 9.2V DC, + 15.5V DC, + 5.1V DC, – 4.8V DC and – 8.3V DC Regulator circuits are stopped generation of the DC voltages.

7.5 Short Detect Circuit

When the DC voltage regulator output lines such as + 9.2V DC, + 5.1V DC, – 4.8V DC and – 8.3V DC become short condition by some accident, the short detect circuit generate short condition signal to switching control IC such as IC1, IC2 and IC3. Then the corresponded IC received the short condition signal becomes inactive mode and stop operation for generating the DC voltage.

7-5-1 + 9.2V Short Detect Circuit

When + 9.2V line becomes short circuit condition by some accident, this circuit composed of Q5 and Q4 supplies H level signal to pin15 of IC1. Then IC1 stops operation.

7-5-2 + 5.1V Short Detect Circuit

When + 5.1V line becomes short circuit condition by some accident, this circuit composed of Q7 and Q6 supplies H level signal to pin15 of IC2. Then IC2 stops operation.

7-5-3 – 4.8V Short Detect Circuit

When – 4.8V line becomes short circuit condition by some accident, this circuit composed of Q12 supplies H level signal to pin15 of IC2. Then IC2 stops operation.

7-5-4 – 8.3V Short Detect Circuit

When – 8.3V line becomes short circuit condition by some accident, this circuit composed of Q13 supplies H level signal to pin15 of IC3. Then IC3 stops operation.

7-6 Lens Iris Control Circuit

This circuit receives NAM (non-additive mixing) video signal sent from the Process board and send the peak level of the video signal to the auto iris lens in order to control the lens iris automatically.

The NAM signal of red (R), green (G) and blue (B) sent from the Process board is fed to NAM video amplifier Q412 through Q401. The iris gate Q402 inhibits approximate 1/4 upper portion of the NAM video signal.

The iris gate Q402 is controlled by ALC Gate Pulse sent from the Sync/Encoder board.

This prevents unwanted influence from the sky and ceiling lights which normally come into the upper part of picture.

The gated NAM video signal at the base of Q402 is then sent to the peak value detect circuit consisting of IC403 (b) and Q413-Q415.

C417 at the emitter of Q413 stores the peak level of the gated NAM video signal. Q415 controls the peak hold timing by the hold control signal sent from pin6 of Monostable Multivibrator IC404 which sets the width of hold control signal. The peak level of the NAM video signal is transferred to C418 when Q415 is turned on. And Q11 is turned on by vertical clamp pulse sent from pin10 of IC404 to discharge C16 after the peak level is sent to C418 through Q415. Therefore the new peak level signal is detected every field by Q413 and C417 and sent to pin5 of IC403 (b).

At the same time, the upper 1/4 compressed NAM video signal obtained at the base of Q413 is integrated by R464 and C419 through buffer Q409.

The average level of NAM signal thus made is sent to IC401 (a) and amplified by IC401 (a).

Then the peak level and this average level are added at R472.

The upper 1/4 compressed NAM video signal obtained at the emitter of Q409 is sent to the 12-pin Lens Connector as iris video output through amplifier Q416/Q417 and pin33 of CN1.

Q420 forces the lens iris closed by setting cathode potential of D404 to low level when camera is in the standby, color bar, auto black setting or power off mode.

The voltage obtained at pin2 of IC403 (a) is amplified by IC403 (a) in order to meet the requirements of the lens.

VR403 (ALC GAIN) adjusts the lens hunting.

When the Lens Iris Selection Switch SW1 on the Front Switch board is set to 1/2 OPEN position, the control terminal (pin10) of IC402 becomes low (L) level and pins 2 and 15 of IC402 are connected. As a result, the voltage at pin3 of IC403 (a) is connected to +9.2V DC power line through R416, and the lens iris opens 1/2 F-stop.

When the Lens Iris Selection Switch SW1 is set to 1/2 CLOSE position, the control terminal (pin11) of IC402 becomes low (L) level and pins 4 and 12 of IC402 will be connected. As a result, pin 3 of IC403 (a) is connected to ground through R417, and the lens iris closes 1/2 F-stop.

The iris control voltage obtained at pin 1 of IC403 (a) is then fed to the emitter of anticlose Q403 which prevents the output voltage from falling below 2.5V and the iris will not close during operation. The lens iris is controlled by VR404 (ANTI-CLOSE) so that the lens iris stops at F16 even if the camera is aimed at the bright object.

The iris control voltage obtained at the emitter of Q403 is fed to the remote iris control switch Q404 and IC402 which sense a control voltage of pin18 of CN1, and it is sent to 12 pin lens connector through pin39 of CN1. Q405 is the lens close switch at stand by or power off mode.

Q411, Q410 and D407 generate +12V lens power. During the camera power is ON, +8.8V is applied to Q411 through D407, R450 and R451. Then Q411 and Q410 are turned on and +12V which is directly supplied to the emitter of Q410 is sent to the lens through Q410.

When the camera power is turned OFF, +8.8V power supply falls to 0V quickly, but C410 is charged and holds Q410 and Q411 ON for about 10 seconds. During 10 seconds, the +12V which does not pass through the power switch is fed to the lens to close the lens iris.

8. SYNC/Encoder Board

8-1 Encoder Colder Bar Generator Circuit

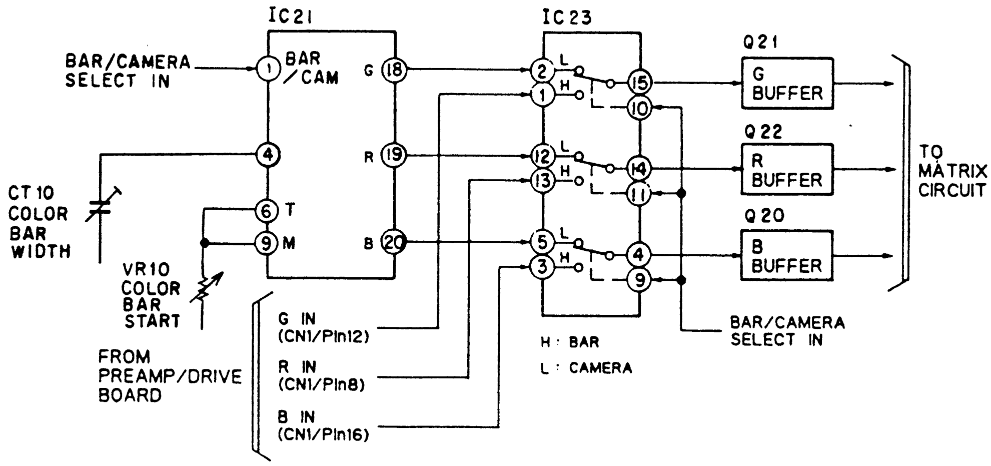

IC21
IC23
BAR/CAMERA SELECT IN
BAR /CAM
G
R
B
T
M
1
4
6
9
18
19
20
CT10 COLOR BAR WIDTH
VR10 COLOR BAR START
FROM PREAMP/DRIVE BOARD
G IN (CN1/Pin12)
R IN (CN1/Pin8)
B IN (CN1/Pin16)
L
H
2
1
15
10
12
13
14
11
5
3
4
9
H : BAR
L : CAMERA
Q21
G BUFFER
Q22
R BUFFER
Q20
B BUFFER
TO MATRIX CIRCUIT
BAR/CAMERA SELECT IN

Fig. 8-1 Color Bar Generator Circuit

This circuit consisting of color bar generator IC21, CT10 (COLOR BAR WIDTH) and VR10 (COLOR BAR START) generates signal necessary for making full-field color bar signal.

When the Color Bar/Camera Selection Switch is set to the Bar position, the low (L) potential is fed to pin 1 of IC21 and the R, G and B bar signals are supplied from pins 19, 18 and 20 of 21 to pin 12, 2 and 5 of the Bar/Camera Selector IC23 respectively. On the other hand, the R, G and B signal picked up by the camera and supplied from the Process board are respectively fed to pins 13, 1 and 3 of IC23.

IC23 selects the bar signals or the camera signals by the potential of the Bar/Camera select signal applied to control terminals (pins 9~11) of IC21.

The selected R, G and B signal obtained at pins 14, 15 and 4 of IC21 are sent through buffers Q22, Q21 and Q20 to the Y, U and V matrix circuits.

8-2 Encoder Y Matrix Circuit

The R, G and B signal selected by analog switch IC23 are respectively sent through resistance-matrix consisting of R215~R219 to the emitter of amplifier Q23 where they are mixed in the fixed proportion and the luminance (Y) signal is made.

The Y signal thus made is sent to Q65 of viewfinder signal process circuit and pin30 of IC24.

8-3 Encoder U Matrix Circuit

This circuit consisting of Q49~Q57 receives R, G and signal from the encoder color bar circuit and generates U signal by the following equation.

$$U-0.89B-0.3R-0.59G$$

The B signal is fed to the base of Q49 through VR24 (U WHITE BALANCE) and R and G signals are fed to the of Q50. The U signal obtained at the collector of Q50 is fed through Q51 and VR25 B-Y (GAIN) to the encoder balance modulation circuit through R326, Q56 and Q57.

On the other hand, the U signal obtained at the collector of Q50 is sent to B/P_B selector IC27 (b) through Q52 and Q53. And the B signal from butter Q20 is also sent to B/P_B selector IC27 (b) through Q54 and Q55. Then these signals are selected by IC27 (b) using B/P_B signal which is sent to pin 9 of IC27 (b) through pin9 of CN1 from Camera Adaptor.

This B/P_B signal is controlled by selecting RCU/VTR signal selection switch on the side of Camera Adaptor.

As a result the selected B or P_B signal is sent to pin25 of CN1 from pin 4 of IC27 (b).

8-4 Encoder V Matrix Circuit

This circuit consisting of Q38~46 receives R, G and B signal from the encoder bar circuit and generates V signal by the following equation.

$$V = 0.7R - 0.59G - 0.11B$$

The R signal is supplied to the base of Q38 through VR21 (V WHITE BALANCE) and G signals are fed to the base of Q39.

The V signal obtained at the collector of Q39 is sent through Q40 and VR23 (R-Y GAIN) to the encoder balance modulation circuit through VR22 (R-Y LEVEL), Q45 and Q46.

On the other hand, the V signal obtained at the collector of Q9 is sent to R/P_R selector IC27 (a) through Q41 and Q42. And the R signal from butter Q22 is also sent to R/P_R selector IC27 (a) through Q43 and Q44. Then these signals are selected by IC27 (a) using R/P_R signal which is sent to pin 10 of IC27 (a) through pin9 of CN1 from Camera Adaptor.
This R/P_R signal is controlled by selecting RCU/VTR signal selection switch on the side of Camera Adaptor.
As a result the selected R or P_R signal is sent to pin21 of CN1 from pin 15 of IC27 (a).

8-5 Encoder Balance Modulator Circuit

This circuit generates the chrominance (c) signal from the U and V color difference signals.
The V signal from encoder V matrix circuit is fed to pin 3 of IC24 . The burst gain of V signal is adjusted by VR27 (BURST GAIN) and then supplied to modulation circuit where the clamped V signal is modulated by subcarrier signal for reproducing the V signal.
Similarly, the U signal from encoder U matrix circuit circuit is passed to U modulation circuit through balance modulator and clamp circuit for reproducing the B signal.
VR14 (V CARRIER BAL ANCE) and VR15 (U CARRIER BAL ANCE) adjust the DC level at pins 21 and IC24 to minimize the carrier leak for the modulators.
The V and U signal are mixed to generate chrominance (C) signal, and C signal obtained 47 of IC24 is fed to 4.43MHz band pass filter (B.P.F) CF1 where the chrominance component is only passed through.
The C signals is then sent through amplifier Q36~Q37 to the other circuit and board.

The Y signal obtained at the encoder Y matrix circuit is fed through pin 30 of IC24 to Sync/blanking (BL) mix circuit where the sync signal and blanking signal are mixed with U signal.
The composite thus mode Y signal is sent through pin 28 of IC24 to the other circuit and board.

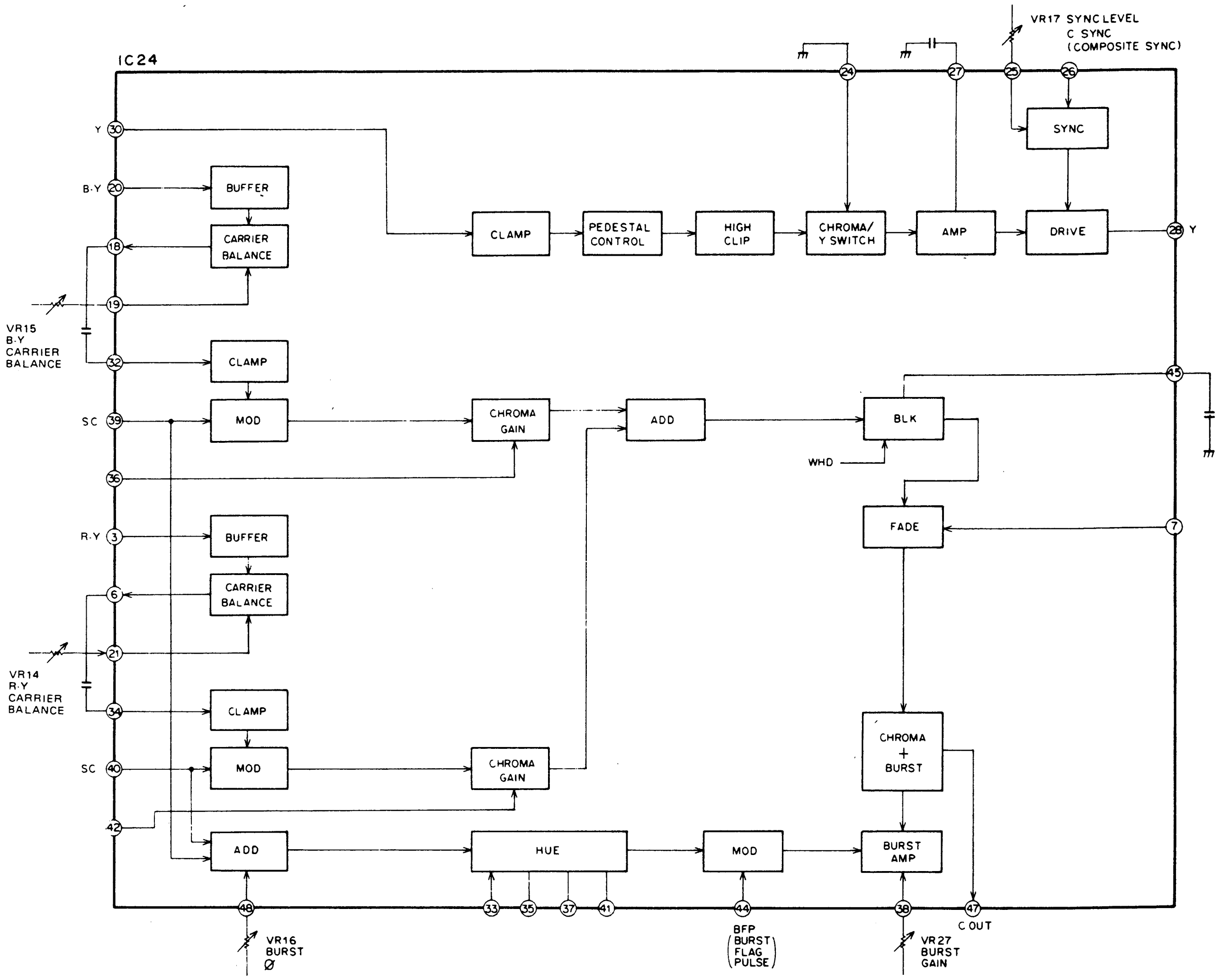

IC24
VR17 SYNC LEVEL
C SYNC
(COMPOSITE SYNC)
24
27
25
26
SYNC
Y
30
B-Y
20
BUFFER
CARRIER BALANCE
18
19
VR15
B-Y
CARRIER
BALANCE
32
CLAMP
CLAMP
PEDESTAL CONTROL
HIGH CLIP
CHROMA/ Y SWITCH
AMP
DRIVE
28
Y
45
SC
39
MOD
CHROMA GAIN
ADD
BLK
WHD
36
FADE
7
R-Y
3
BUFFER
CARRIER BALANCE
6
21
VR14
R-Y
CARRIER
BALANCE
34
CLAMP
SC
40
MOD
CHROMA GAIN
CHROMA + BURST
42
ADD
HUE
MOD
BURST AMP
48
33
35
37
41
44
38
47
C OUT
VR16
BURST
0
BFP
(BURST FLAG PULSE)
VR27
BURST
GAIN

Fig. 8-5 Block Diagram of IC24

8-6 Viewfinder Signal Process Circuit

This circuit receives Y signal, 1/3f subcarrier (SC) signal and character signal and makers of EVE video signal.

The Y signal from emitter of Q24. is sent through buffer Q65 to clamp circuit consisting of Q66 and VR26 (ZEBRA LEVEL) where it is clamped with the DC voltage set by VR26 (ZEBRA LEVEL). The clamped Y signal is fed through amplifier Q69/Q70 to the control terminal (pin 8) of IC31. On the other hand, the Y signal obtained at emitter of Q28 is sent to pin 10 of IC31 and 1/3f subcarrier (SC) signal obtained at pin 50 of IC5 is supplied to pin 9 of IC31. When Y signal exceeds a specified level, pin 8 of analog switch becomes high (H) potential and 1/3f subcarrier signal is sent out.

When the Y signal does not exceed a specified level, pin 8 of analog switch becomes low (L) potential and Y signal is sent out.

The Y signal with zebra thus obtained is fed to another analog switch in IC31 for mixing character signal. The analog switch consisting of pins 5~7 of IC31 receives the Y signal with zebra and character signal and its switching is controlled by character blanking signal supplied to pin 7 of IC31.

The signal thus obtained at pin 5 of IC31 is supplied through amplifier Q71/Q72 to pin 13 of EVF Video/Return video selector IC32 (c). On the other hands, the return video from the VTR is supplied through amplifier Q73/Q74 to pin 12 of IC32 (c). The analog switch is controlled by return video control signal supplied from the lens. As a result, the EVF video signal or return video signal is sent to the EVF through buffer Q75.

8-7 Output Amp Circuit

This circuit receives luminance (Y) signal and chrominance (c) signal and generates a composite video signal.

The Y signal with the sync signal obtained at encoder balance modulator circuit is fed to the base of Q79 and C signal with the burst signal is fed to the emitter of Q33, and then they are mixed for making the composite video signal.

The composite video signal thus obtained at the collector of Q34 is supplied through butter Q34 to amplifier IC26.

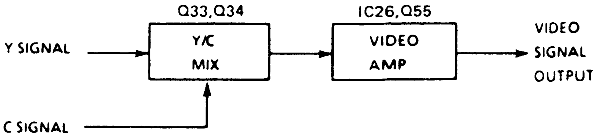

Q33,Q34
IC26,Q55
Y SIGNAL
Y/C
MIX
VIDEO
AMP
VIDEO
SIGNAL
OUTPUT
C SIGNAL

Fig. 8-7 Output Amp Circuit

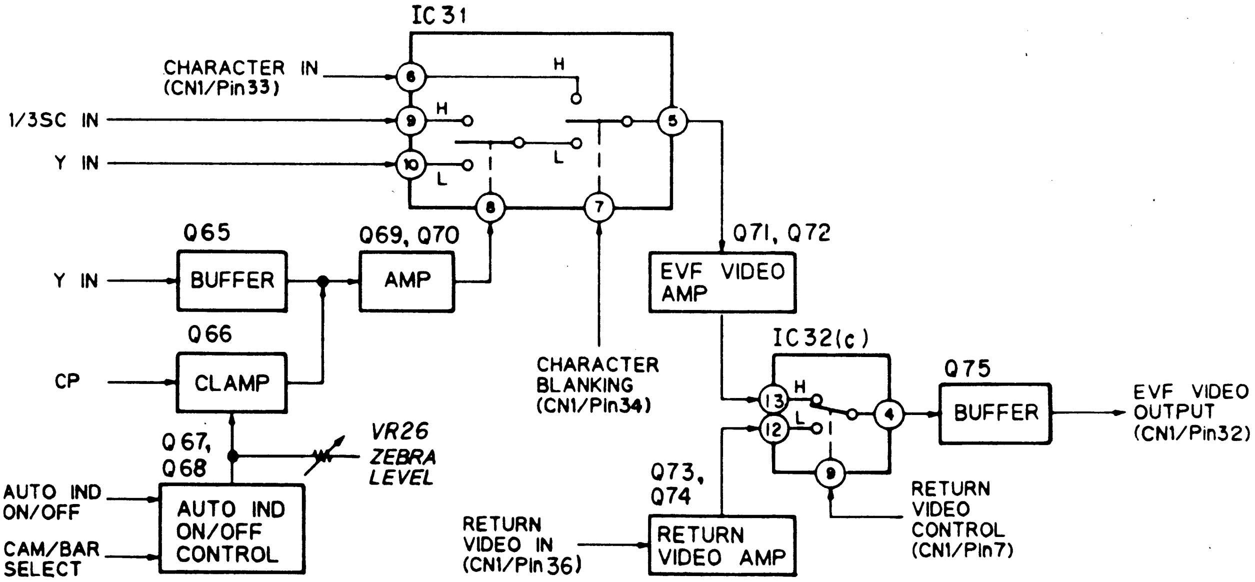

IC 31
CHARACTER IN
(CN1/Pin33)
1/3SC IN
Y IN
H
L
6
9
10
8
7
5
Q65
BUFFER
Q69, Q70
AMP
Y IN
Q66
CLAMP
CP
Q67,
Q68
VR26
ZEBRA
LEVEL
AUTO IND
ON/OFF
CAM/BAR
SELECT
AUTO IND
ON/OFF
CONTROL
CHARACTER
BLANKING
(CN1/Pin34)
Q71, Q72
EVF VIDEO
AMP
IC32(c)
13
12
4
9
Q73,
Q74
RETURN
VIDEO IN
(CN1/Pin36)
RETURN
VIDEO AMP
Q75
BUFFER
EVF VIDEO
OUTPUT
(CN1/Pin32)
RETURN
VIDEO
CONTROL
(CN1/Pin7)

Fig. 8-6 Viewfinder Signal Process Circuit

8-8 Gen-Lock Sync Separation Circuit

This circuit receives the black burst signal or color signal supplied to the gen-lock input connector on the side of camera adaptor and separates the sync burst signal from the gen-lock signal. The separated sync and burst signal is fed to the sync generator IC5 for the gen-lock/external sync mode.

The gen-lock signal sent through pin 17 of CN1 buffer Q1 and amplifier Q2/Q3 to sync separator Q5/Q6, and the separated sync signal is then fed through buffer Q6 and inserter IC1 (a)(b) to pin 7 of IC5. When it is fed to pin 7 of IC5, The sync generator iC5 is converted into the gen-lock/external sync mode and pulses which are synchronized with the separated sync signal is generated.

The sync signal which is separated from the gen-lock signal is sent to integrator consisting of R17~R18, C7 and C8 to remove the horizontal component. The vertical (V) component thus detected is fed through inverted Q7 and IC1 (c) to pin 62 of IC5 to reset it vertically.

As a result, sync generator generates V pulses which are synchronized with the V component of the gen-lock signal.

The gen-lock signal is also sent to burst gate circuit consisting of Q8~Q13 and IC1 (b). The gen-lock signal is sent through buffer Q8 to burst gate Q9 where the burst signal is detected by the burst gate pulse supplied to the base of Q9 from pin 49 of IC5. The detected burst signal is fed through amplifier Q10~Q12 and inverter Q13/IC1 (d) to pin 43 of ic5, and the sync generator generates the subcarrier (SC) signal which is synchronized with the detected burst signal.

8-9 Sync Generator Circuit

This circuit receives the 17.7MHz signal in internal sync mode or external sync mode and generates all signals used in the camera.

The pin identification of sync generator IC5 is as follows.

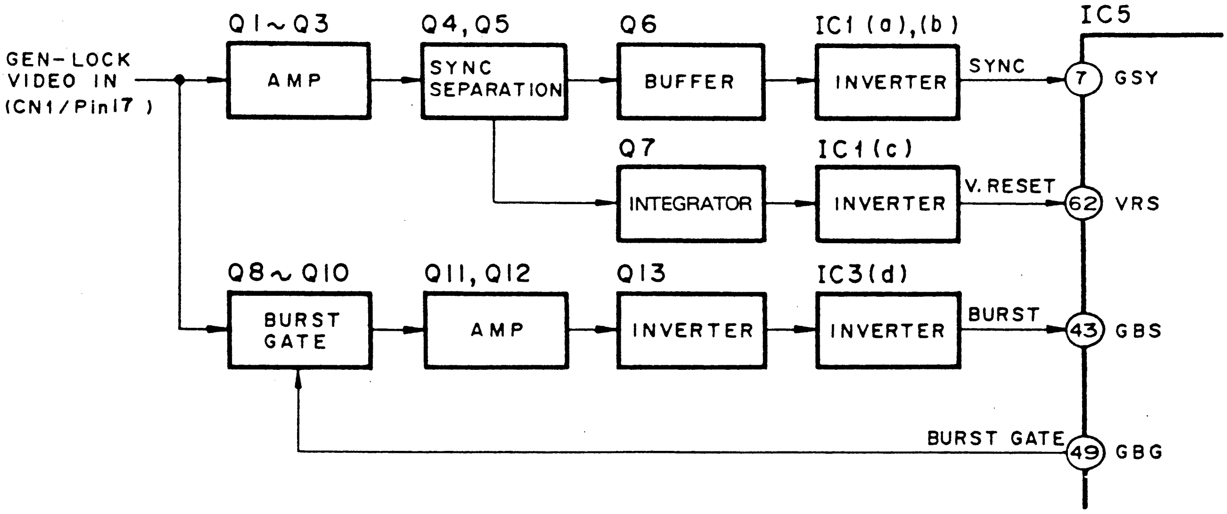

GEN-LOCK
VIDEO IN
(CN1/Pin17)
Q1~Q3
AMP
Q4,Q5
SYNC
SEPARATION
Q6
BUFFER
IC1 (a),(b)
INVERTER
SYNC
IC5
7
GSY
Q7
INTEGRATOR
IC1 (c)
INVERTER
V. RESET
62
VRS
Q8~Q10
BURST
GATE
Q11, Q12
AMP
Q13
INVERTER
IC3(d)
INVERTER
BURST
43
GBS
BURST GATE
49
GBG

Fig. 8-8 Gen-Lock Sync Separation Circuit

MB87075.B
SYNC LSI
Pin Identification

Pin No.	Name	In/Out	Description
1	GLC		
2	VB1	-	Not Used
3	VDD1	In	+ 5V DC Power
4	GIE	-	Not Used
5	NP	-	Not Used
6	IEO	Out	Internal/External mode Output
7	GSY	In	Gen-lock Sync Input
8	VDD1	In	+ 5V DC Power Input
9	VSS1	-	Ground
10	TST1	-	Not Used
11	TST2	-	Not Used
12	TST3	-	Not Used
13	TST4	-	Not Used
14	VSS1	-	Ground
15	EBI	-	Not Used
16	PBI	-	Not Used
17	EBO	-	Not Used
18	PBO	-	Not Used
19	GSE	-	Not Used
20	VSS2	-	Ground
21	VDD2	In	+ 5V DC Power
22	SPD	Out	Phase Detect Output for SC
23	SVI	In	External 17.7MHz Input
24	SVO	Out	External 17.7MHz Output
25	OSI	In	Internal 17.7MHz Input
26	OSO	Out	Internal 17.7MHz Output
27	VSS2	-	Ground
28	VDD3	In	+ 5V DC Power
29	GSC	In	SC Phase
30	VSS2	-	Ground
31	VDD4	In	+ 5V DC Power
32	S2C	In	Color Bar Phase-1 Control
33	VSS4	-	Ground
34	VDD5	In	+ 5V DC Power
35	S1C	In	Color Bar Phase-2 Control
36	VSS5	-	Ground
37	VDD6	In	+ 5V DC Power
38	P2C	-	Not Used
39	VSS6	-	Ground
40	VDD1	In	+ 5V DC Power
41	GC2	In	External Sub carrier Phase Control-2
42	GC1	In	External Subcarrier Phase Control-1
43	GBS	In	Gen-lock Burst Input
44	SHC	In	Subcarrier Phase Control
45	SC1	Out	Subcarrier-1 Pulse
46	SC2	Out	Subcarrier-2 Pulse
47	PSQ	-	Not Used
48	BFP	Out	Burst Flag Pulse
49	GBG	Out	Burst Gate Pulse
50	ZBR	Out	1/3 Subcarrier Signal
51	BSC	-	Not Used
52	VSS1	-	Ground
53	VDD1	In	+ 5V DC Power
54	ALX	-	Not Used
55	AL1	-	Not Used
56	ALC	Out	ALC Gate Pulse
57	FLM	Out	Color Frame Pulse
58	VDR	Out	Vertical Drive Pulse
59	VST	Out	Vertical Start Pulse
60	VBL	Out	Vertical Blanking Pulse
61	VIS	-	Not Used
62	VRS	In	V Reset Input
63	HB1	-	Not Used
64	VDD1	Om	+ 5V DC Power
65	VSS1	-	Ground
66	HB2	-	Not Used
67	HRS	-	Not Used
68	HD	Pit	Horizontal Drive pulse
69	CP	Out	Clamp pulse
70	HWS	-	Not Used
71	FH	-	Not Used
72	BCP	-	Not Used
73	VSS1	-	Ground
74	VDD1	In	+ 5V DC Power
75	HPE	-	Not Used
76	GPE	-	Not Used
77	VSS7	-	Ground
78	VDD7	In	+ 5V DC Power
79	HPC	-	Not Used
80	VSS8	-	Ground
81	VDD8	In	+ 5V DC Power
82	GPC	In	Gen-Lock H Phase DC
83	VSS9	-	Ground
84	VDD9	In	+ 5V DC Power
85	HPI	In	VCO for H Lock Input
86	HPO	Out	VCO for H Lock Output
87	HPD	Out	Phase Detect for H Lock
88	PVI	In	
89	PVO	-	Not Used
90	PVD	Out	
91	LTP	-	Not Used
92	VDD1	In	+ 5V DC Power
93	VSS1	-	Ground
94	VWS	-	Not Used
95	CVS	-	Not Used
96	CSB	Out	Composite System Blanking Pulse
97	CPB	Out	Composite Pre Blanking Pulse
98	CSY	Out	Composite Sync Pulse
99	VSS1	-	Ground
100	VB2	-	Not Used

9. Auto Board

9-1 CPU

The pin identifications and functions of CPU IC1 is described in the Table.

IC1
Pin identification.

Pin No.	Name	In/Out	Description
1	P41	Out	R/B Gain & Ped
2	P40	Out	R/B Gain & Ped
3	P53	Out	R/B Gain & Ped
4	P52	Out	R/B Gain & Ped
5	P51	Out	R/B Gain & Ped
6	P50	Out	R/B Gain & Ped
7	RESET	In	Reset Control
8	x2	Out	Clock Pulse Generator (4.19MHz)
9	x1	In	Clock Pulse Generator (4.19MHz)
10	P63	Out	Real Time Clock OE
11	P62	Out	
12	P61	In/Out	ABC Busy
13	P60	In/Out	AWC Busy
14	P73	Out	Inhibit
15	P72	Out	D/A Converter Control
16	P71	Out	D/A Converter Control
17	P70	Out	D/A Converter Control
18	P83	In	Data Input Switch
19	P82	In	A/D Converter
20	P81	In	AWC Comparator H/L
21	P80	In	ABC Comparator H/L
22	P93	Out	RB/G Select
23	P92	Out	R/B Select
24	P91	Out	ABC RB/G Select
25	P90	Out	AWC Hold Reset
26	VSS	-	
27	P13/INT3	-	Camera/RCU
28	P12/INT2	-	Auto Preset
29	P11/INT1	-	Auto Preset
30	P10/INT0	In	Power OFF
31	PTH03	In	Filter 2
32	PTH02	In	+ 5V
33	PTH01	-	Not Used
34	PTH00	In	AWC A/B/Preset Select
35	TI0	In	VTR start/stop
36	TI1	In	V. BL
37	P23	Out	Auto Indicator
38	P22/PCL	Out	Battery Warining
39	P21/PT01	Out	Character Gen Strobe
40	P20/PT00	Out	Shutter ON/OFF
41	P03/SI	In	Real Time Clock
42	P02/SO	Out	Character Data
43	P01/SCK	Out	Character Serial Clock
44	P00/INT4	In	Tape REW
45	P123	In	Bar/Camera Select
46	P122	In	Rec Tally Control
47	P121	In	Rec Time Reset
48	P120	In	Check ON/OFF
49	P133	In	-6dB ON/OFF
50	P132	In	Filter 1
51	P131	-	Not Used
52	P130	In	Matrix Control
53	P143	In	DTL Band H/L
54	P142	In	Detail ON/OFF
55	P141	In	Iris 1/2 Close
56	P140	In	Iris 1/2 Open
57	NC	-	
58	VDD	In	+ 5V
59	P33	In/Out	Shutter-2 ON/OFF
60	P32	In/Out	Shutter-1 ON/OFF
61	P31	In/Out	Gain-2 (+ 18dB) ON/OFF
62	P30	In/Out	Gain-1 (+ 9dB) ON/OFF
63	P43	Out	R/B Gain & Ped
64	P42	Out	R/B Gain & Ped

9-2 Reset Control Circuit

When turn on the Power, + 5V DC is supplied to the base of Reset Control Q15, and negative Pulse obtained at the collector of Q15 is supplied to Pin 7 of IC1 to reset the Program of CPU IC1.

9-3 Power OFF Detect Circuit

During operating mode, Pin 5 of IC10 is set to high(H) level. When power is turned OFF, potential of Pin 5 of IC10 changes to low(L) level, which is supplied to Pin 30 of IC1 to inform that Power is turned OFF.

9-4 Battery Warning Output Circuit

When DC Power supplied to the camera goes down to 10.6V, battery warning pulse obtained at Pin 38 of IC1 is supplied through battery warning output Q11 to electronic viewfinder to blink the Battery Warning Indicator.

9-5 Character Generator

The CPU IC1 receives informations for character display from other circuits and character informations obtained at Pin 42 of IC1 is supplied to Pin 1 of character generator IC8. The character signal corresponding to character information is obtained at Pin 11 and supplied to Sync/Encoder board in order to mix it with video signal.

The clock Pulse frequency of IC8 is adjusted by CT1 (CHARACTER POSITION).

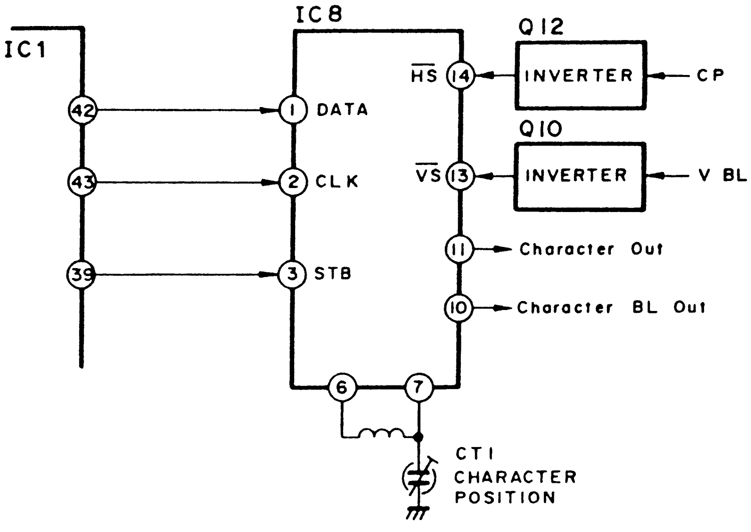


Fig. 9-5 Character Generator Circuit

9-6 D/A, Demultiplex Circuit

9-6-1 AWC Control

R and B signals are compared with G signal by AWC control IC7 (b). If the B signal is higher than G signal, the output obtained at Pin 1 of IC7 (b) becomes low (L) and supplied to Pin 20 of CPU IC1. IC1 instructs the count down digital code to D/A converter Z1 for decreasing B gain, and output obtained at Pin 10 of Z1 is then supplied through buffer IC5 (d), pins 3 and 14 of IC2 and B gain DC output IC3 (b) to Pin 10 of CN11.

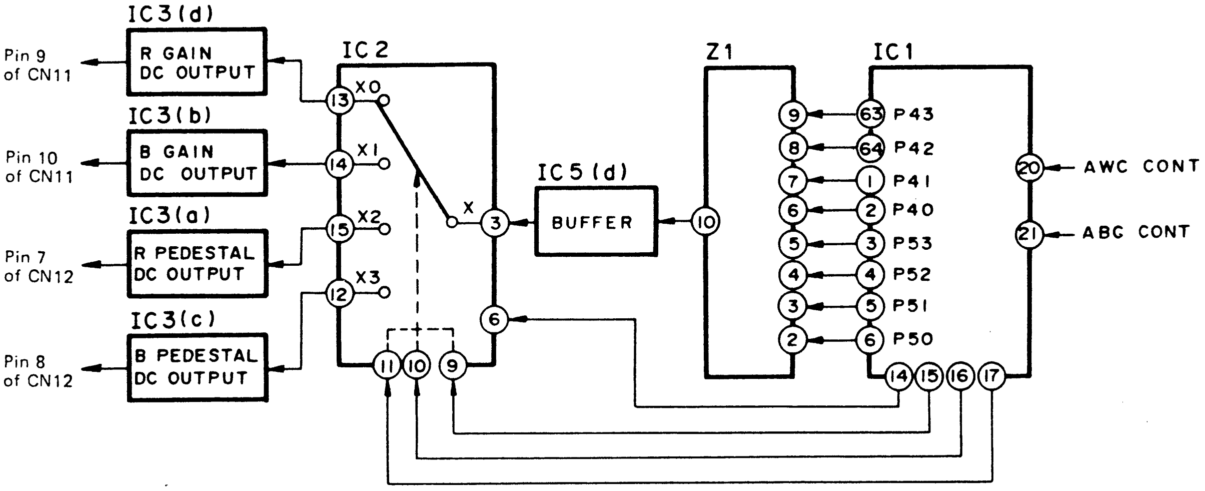
If the B signal is lower than G signal, the reverse order takes place. The R gain is also controlled in the similar way as B signal. The adjustment for B and R gains are alternately carried out.

9-6-2 ABC Control

R and B signals are compared with G signal by ABC control IC7 (a) through buffer IC14(a) and IC14 (b). If the B signal is higher than G signal, the output obtained at Pin 2 of IC7 (a) becomes low (L) and supplied to pin 21 of CPU IC1. IC1 instructs the count down digital code D/A converter Z1 for decreasing B Pedestal and output obtained at Pin 10 of Z1 is then supplied through buffer IC5 (d), pins 3 and 12 of IC2 and B pedestal DC output IC3 (c) to pin 8 of CN12.

If the B signal is lower than G signal, the reverse order takes place.

The R Pedestal is also controlled in the similar way B pedestal. The adjustment for B and R Pedestals are alternately carried out.


IC3(d)
R GAIN DC OUTPUT
Pin 9 of CN11
IC3(b)
B GAIN DC OUTPUT
Pin 10 of CN11
IC3(a)
R PEDESTAL DC OUTPUT
Pin 7 of CN12
IC3(c)
B PEDESTAL DC OUTPUT
Pin 8 of CN12
IC2
X0
X1
X2
X3
X
IC5(d)
BUFFER
Z1
IC1
P43
P42
P41
P40
P53
P52
P51
P50
AWC CONT
ABC CONT

INPUT			CONNECTION
Pin 9	Pin 10	Pin 11	
L	L	L	⑬ —— ③
L	L	H	⑭ —— ③
L	H	L	⑮ —— ③
L	H	H	⑫ —— ③

Fig. 9-6 D/A, DemultiPlex Circuit

9-7 AWC Circuit

This circuit automatically sets the Peak levels of R and B signals for matching them with the Peak level of G signal by utilizing analog switch IC6, AWC control IC7(b) and CPU IC1.

R or B signal selected by IC6 is obtained at pin 4 of IC6, and peak level of R or B signals is held by R/B peak hold Q7.

The peak level of R or B signal is supplied to AWC control IC7.

On the other, G signal selected by IC6 is obtained at pin 14 of IC6 and peak level of G signal is held by G peak hold Q6. The peak level of G signal is also supplied to IC7(b), where peak levels of R/B and G signals are compared, and the comparison output signal is sent to pin 20 of IC1.

After comparing them, peak levels of R, G and B signals held by Q6 and Q7 are discharged by R/B charge reset Q9 and G charge reset Q8.

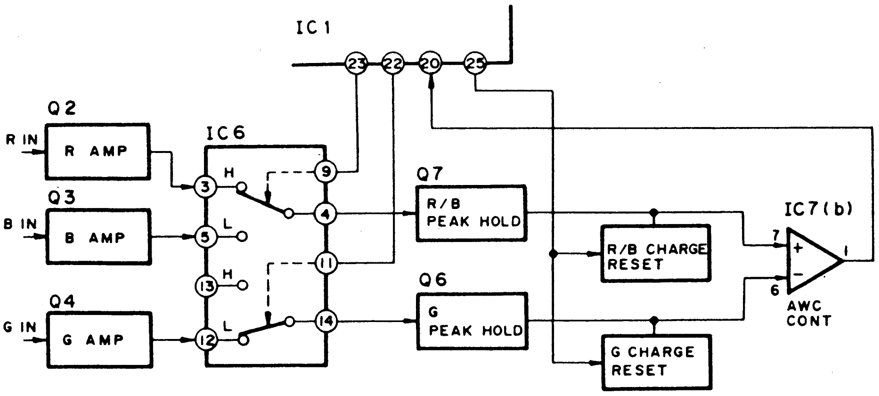

IC1
Q2
R IN
R AMP
Q3
B IN
B AMP
Q4
G IN
G AMP
IC6
H
L
H
L
Q7
R/B PEAK HOLD
Q6
G PEAK HOLD
R/B CHARGE RESET
G CHARGE RESET
IC7(b)
AWC CONT

Fig. 9-7 AWC Circuit

9-8 ABC Circuit

This circuit automatically set the pedestal levels of R and B signals for matching them with the pedestal level of G signal by utilizing analog Switch IC6, ABC control IC7 (a) and CPU IC1.

R or B pedestal level selected by IC6 is obtained at pin 4 of IC6 and supplied to pin 13 of IC6. R/B pedestal levels supplied to pin 13 and G pedestal level supplied to pin 12 selected alternately by control signal from pin 11 is obtained at pin 14 and supplied to pin 15 through buffer Q5. G and R/B pedestal levels obtained at pins 1 and 2 alternately by control signal from pin 10 are supplied to ABC control IC7(a), where G and R/B pedestal level are compared and comparison output signal obtained at pin 2 of IC7(a) is supplied to pin 21 of IC1.

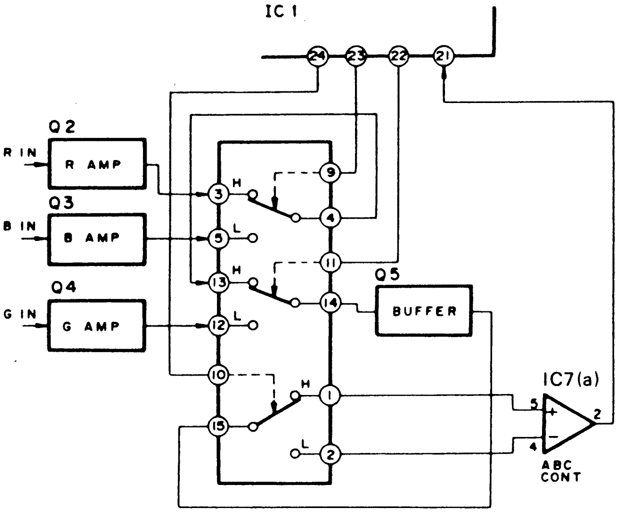


Fig. 9-8 ABC Circuit

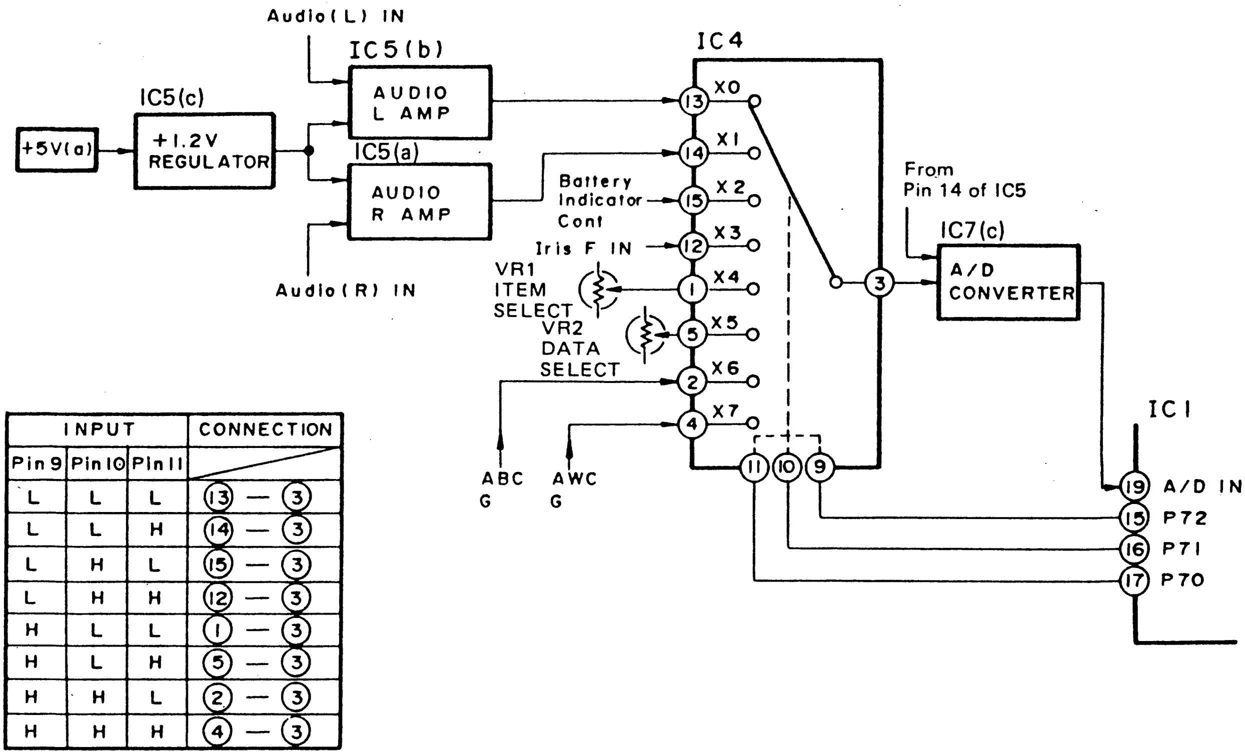
9-9 Multiplexer

IC4 receives informations such as Audio (L,R), Battery indicator, Iris F stop, etc and selected output is obtained at pin 3 of IC4. The Output signal is then converted to digital signal by IC7 (c) and supplied to IC1 through pin 19.

9-10 Real Time Clock

The Real Time Clock IC15 counts the time and date.

These data obtained at pin3 of IC15 is sent to pin40 of IC1 and these data is displayed on the CRT of viewfinder when the camera is Color Bar mode and push the SW1 on the Auto board during pushing the Check Button on the Mother board.


Audio(L) IN
IC5(b)
AUDIO L AMP
IC5(c)
+5V(a)
+1.2V REGULATOR
IC5(a)
AUDIO R AMP
Audio(R) IN
IC4
X0
X1
X2
X3
X4
X5
X6
X7
Battery Indicator Cont
Iris F IN
VR1 ITEM SELECT
VR2 DATA SELECT
ABC G
AWC G
From Pin 14 of IC5
IC7(c)
A/D CONVERTER
IC1
A/D IN
P72
P71
P70

INPUT			CONNECTION
Pin 9	Pin 10	Pin 11	
L	L	L	⑬ — ③
L	L	H	⑭ — ③
L	H	L	⑮ — ③
L	H	H	⑫ — ③
H	L	L	① — ③
H	L	H	⑤ — ③
H	H	L	② — ③
H	H	H	④ — ③

Fig. 9-9 Multiplex Circuit

10. Camera Adaptor

10-1 RCU Power Control Circuit

This circuit consisting of IC10, IC11, Q18, Q19 and Q20 receives the serial data signal from the RCU, and generates +9V DC when the serial data is being supplied and +9V DC is supplied to all circuits on the main board.

The serial data pulse is supplied to pin 4 of monostable multivibrator IC11, and pin 6 (Q output) becomes high (H) level when the serial data is fed and low (L) level when the serial data is not supplied. This output through inverter Q20 is sent to other circuit as RCU/Camera Selection Signal.

On the other hand, pin 7 of IC11 (Q bar output) turns to low (L) level when the serial data is supplied and it turns Q19 off and +9V DC regulator consisting of IC 10 and Q18 generates regulated +9V DC power from the unregulated 12V DC obtained at pin 16 and 18 of CN1 and supplied to the emitter of Q18. The +9V DC is supplied to the serial data control circuit on this board.

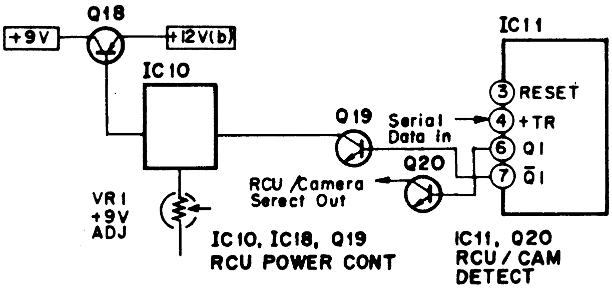
10-2 Serial Data Control Circuit

This circuit receives the control information from the RCU as a serial data (digital signal) and converts it into analog signals and sent them to camera head as control signals.

The serial data from RCU is supplied to comparator IC26(b) through pin 43 of CN1 and the cable loss and noise components are eliminated by IC26(b). The serial data obtained at pin 7 of IC26(b) is then fed to pin 20 of receiver IC25. The serial control pulse (clock pulse) from the RCU is also supplied to pin 21 of receiver IC25 through pin 39 of CN1 and comparator IC26(a) as for the synchronous pulse of serial data communication.

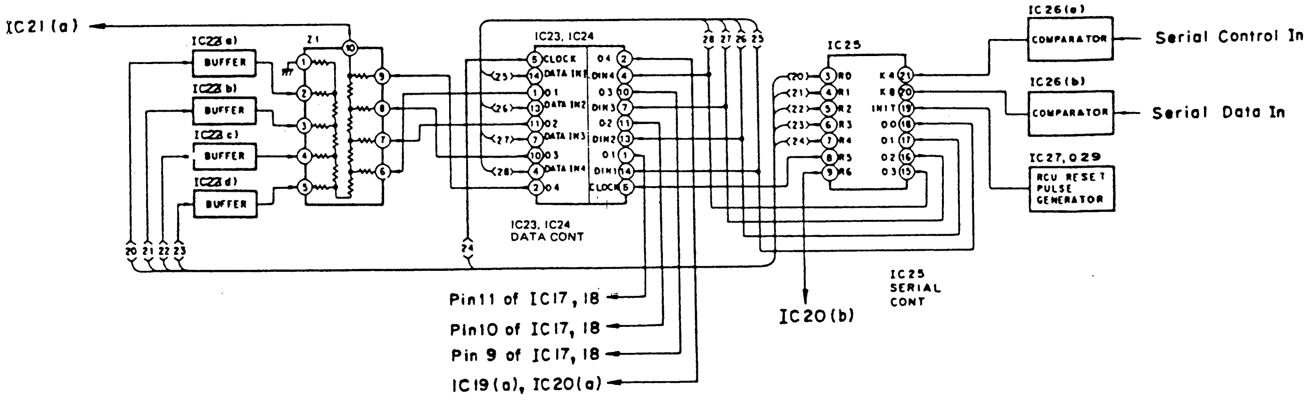
IC27 generates the initial reset pulse for receiver IC25.

IC23, IC24 and IC25 decode the serial data and instructs it at pins 3 through 6 of IC25 via IC22 and pins 1, 10, 11 and 2 of IC23 as an 8-bit data to be forwarded to a D/A convertor Z1.



Q18
+9V
+12V(b)
IC10
IC11
3 RESET
4 +TR
6 Q1
7 $\bar{Q}$1
Q19
Serial Data In
Q20
RCU /Camera Serect Out
VR1 +9V ADJ
IC10, IC18, Q19 RCU POWER CONT
IC11, Q20 RCU / CAM DETECT

Fig. 10-1 RCU Power Control Circuit



IC21 (a)
IC22(a)
IC22(b)
IC22(c)
IC22(d)
BUFFER
Z1
IC23, IC24
CLOCK
DATA IN
IC23, IC24 DATA CONT
Pin11 of IC17, 18
Pin10 of IC17, 18
Pin 9 of IC17, 18
IC19(a), IC20(a)
IC25
IC25 SERIAL CONT
IC20(b)
IC26(a)
COMPARATOR
Serial Control In
IC26(b)
COMPARATOR
Serial Data In
IC27, Q29
RCU RESET PULSE GENERATOR

Fig. 10-2-1 Serial Data Control Circuit-1

The converted analog signal obtained at pin 10 of D/A convertor Z1 is then supplied to demultiplexer IC17 and IC18 through buffer IC21(a).

The digital control output signals of IC17 and IC18 are fed to camera head through IC13(b), IC15(c), IC16 and Q21 through Q28 and analog control output signals of IC17 and IC18 are supplied to camera head via IC12, IC13(a) and (d), IC14, IC15(b) and IC15(d).

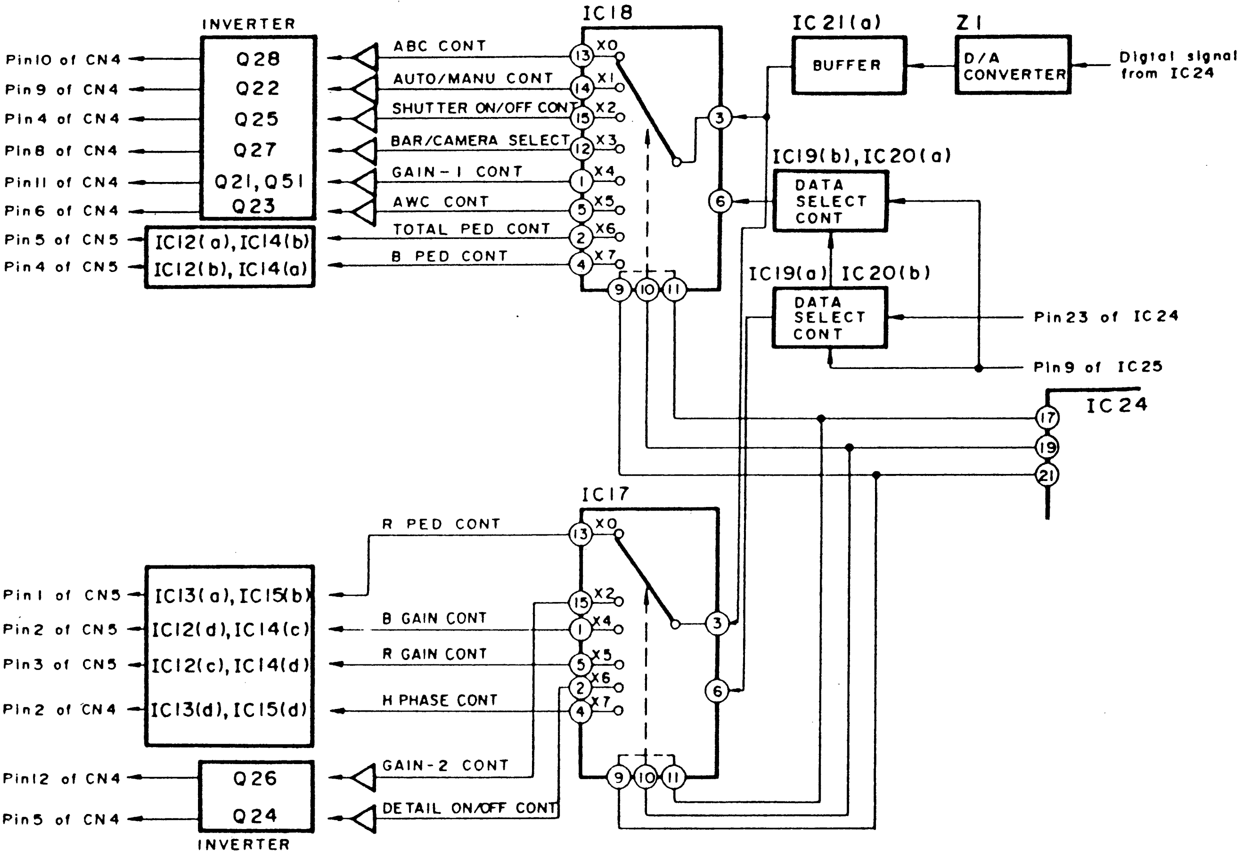

INVERTER
Pin10 of CN4
Pin9 of CN4
Pin4 of CN4
Pin8 of CN4
Pin11 of CN4
Pin6 of CN4
Pin5 of CN5
Pin4 of CN5
Q28
Q22
Q25
Q27
Q21, Q51
Q23
IC12(a), IC14(b)
IC12(b), IC14(a)
ABC CONT
AUTO/MANU CONT
SHUTTER ON/OFF CONT
BAR/CAMERA SELECT
GAIN-1 CONT
AWC CONT
TOTAL PED CONT
B PED CONT
IC18
X0
X1
X2
X3
X4
X5
X6
X7
IC21(a)
BUFFER
Z1
D/A CONVERTER
Digital signal from IC24
IC19(b), IC20(a)
DATA SELECT CONT
IC19(a) IC20(b)
DATA SELECT CONT
Pin23 of IC24
Pin9 of IC25
IC24
IC17
R PED CONT
B GAIN CONT
R GAIN CONT
H PHASE CONT
GAIN-2 CONT
DETAIL ON/OFF CONT
Pin1 of CN5
Pin2 of CN5
Pin3 of CN5
Pin2 of CN4
Pin12 of CN4
Pin5 of CN4
IC13(a), IC15(b)
IC12(d), IC14(c)
IC12(c), IC14(d)
IC13(d), IC15(d)
Q26
Q24
INVERTER

Fig. 10-2-2 Serial Data Control Circuit-2

10-3 Audio Amplifier Circuit

This circuit consisting of IC7,IC8, IC9 and Q14 amplifies the audio signal picked up by the microphone. The amplified audio signal is fed to the VTR for recording and Audio Monitor Jack.

Approximately -70 dB audio signal from microphone is supplied to IC7(a) where the audio signal is amplified 50 dB. As a result, -20 dB audio signal obtained at pin 4 of IC7(a) is supplied to the audio selection analog switch IC8. -60 dB audio signal divided -20 dB audio signal by R65 and R66 is supplied to pin 2 of IC8. The audio level selection signal from SW1 on the Switch board is fed to pin 10 of IC8 via pin 1 of CN1 and the -20 or -60 dB audio signal obtained at pin 15 of IC8 is supplied to the VTR via pin 9 of CN1.

The audio monitor selection signal set by SW2 on the Switch Board is fed to pins 9 & 11 of IC8 to select either INTERNAL or E-E (Playback or Return) audio signal for indicating the audio level on the viewfinder through pin 4 of IC8, IC7(b) and pin 3 of CN6. The selected audio signal obtained at pin 14 of IC8 is sent to the audio monitor jack via pin 7 of CN1, Audio Monitor Level Control VR1 on the Audio Board and the audio amplifier IC9.

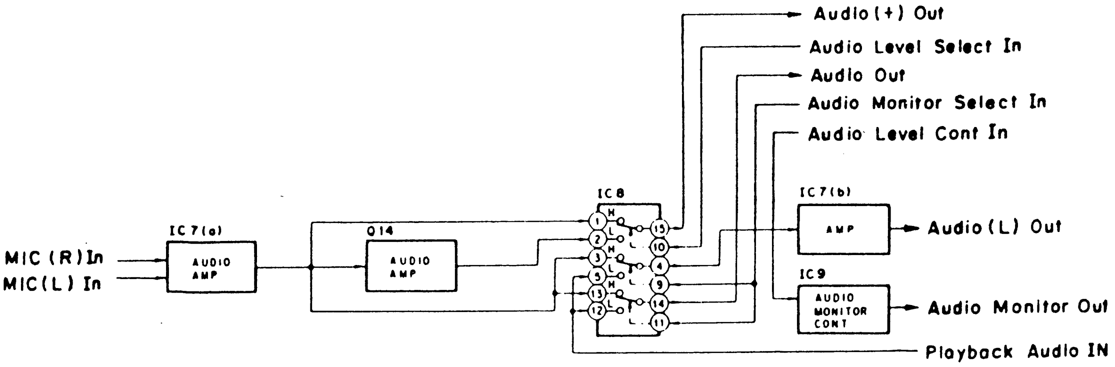


Fig. 10-3 Audio Amplifier Circuit

10-4 VTR Start/Stop Circuit

This circuit receives recording trigger pulse from the lens through Mother board of the camera head and generates the recording start/stop trigger for VTR connected to the camera.

When VTR start/stop button on the lens is pressed, high (H) trigger through pin 1 of CN7 is supplied to Q52 and high (H) trigger is obtained at pin 6 of IC1(a) through Q1.

This trigger pulse is fed to a flip-flop consisting of IC1(b) and IC1(c) and the pin 10 of IC10 changes from low (L) level to high (H) level by the first trigger pulse supplied.

The high(H) level is then supplied to Q2 and low(L) level is obtained at collector of Q2. The low (L) level is supplied to base of Q6 and recording trigger (H) level obtained at the collector of Q6 is supplied to pin 13 of CN1 for 3/4" U-vision VTRs and S-VHS VTRs.

Recording trigger (H) level obtained at the collector of Q5 is supplied to pin 15 (VTR START⊕1) of CN1 for 1/2" VHS VTRs. In the initially turning on the camera power, pin 5 of IC3 becomes low level in order not to start the recording on the VTR for a few seconds period of time.

Recording trigger (L) obtained at the collector of Q4 is supplied to pin 17 (VTR START⊖) for other manufactures VTRs.

The recording trigger pulses obtained at pins 13, 15 and 17 of CN1 is fed to the VTR Compatibility Switch SW4 on the Switch board through pins 2, 3 and 6 of CN7 and pins 4, 5 and 6 of E3 on the Switch board.

This switch selects the required recording trigger pulse according to the VTR connected to the camera.

The VTR Recording or the ON THE AIR tally signal through RCU is selected by the REC/TALLY control circuit consisting of IC2, IC4, IC5(b) IC6(a) Q7 and Q9 so that the recording indicator is on and off by the recording trigger obtained at the collector of Q3 through IC2(c), IC2(b) and Q10 (camera adaptor) /Q17 (viewfinder) in the VTR recoding mode. In this case pin 6 of serial data detector IC11 is low level since no serial data pulse is fed to pin 4 of IC11 and Q20 is turned off to keep the collector of Q20 high level, Q9 turned on and Q7 turned off.

When the RCU is connected to the camera, pin 6 of IC11 becomes high level to turn on Q20 and turn off Q9 and approx. + 7V DC obtained at pin 1 of IC6(a) is fed to pin3 and 6 of IC4 and pin 2 of IC5 so that the tally signal from RCU through pin 19 of CN1 is fed to Q10 and Q17 via IC4 and IC2.

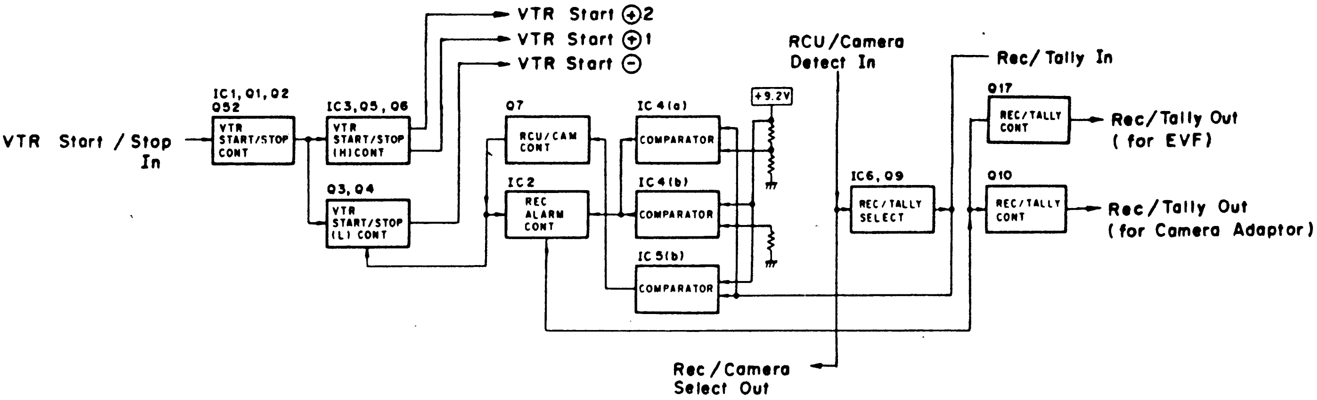

VTR Start ⊕2
VTR Start ⊕1
VTR Start ⊖
RCU/Camera Detect In
Rec/Tally In
VTR Start / Stop In
IC1, Q1, Q2 Q52
VTR START/STOP CONT
IC3, Q5, Q6
VTR START/STOP (H) CONT
Q3, Q4
VTR START/STOP (L) CONT
Q7
RCU/CAM CONT
IC2
REC ALARM CONT
IC4(a)
COMPARATOR
IC4(b)
COMPARATOR
IC5(b)
COMPARATOR
+9.2V
IC6, Q9
REC/TALLY SELECT
Q17
REC/TALLY CONT
Rec/Tally Out (for EVF)
Q10
REC/TALLY CONT
Rec/Tally Out (for Camera Adaptor)
Rec/Camera Select Out

Fig. 10-4 VTR Start/Stop Circuit

10-5 Video/ Auxiliary Selection Circuit

This circuit consisting of IC31, IC33, Q38 through Q40 selects the return video for the viewfinder either playback video or Auxiliary (playback or effect return) video signal.
When the return video control switch on the lens is pressed, low level is fed to pin 9 of IC31 via pin 4 of CN3 and auxiliary video signal fed to pin 53 of CN1 is supplied to Q38 through pins 13, 14, 5 and 4 of IC 31 so that the viewfinder shows auxiliary video signal.
When the return video control switch on the lens is released, high (H) level is sent to pins 9, 10 and 11 of IC31 and composite video signal obtained at the emitter of Q37 is supplied to the VTR via IC31(c), Q40, D4 and pin 51 of CN1.
When the portable S-VHS or VHS VTR is set to playback mode, playback video signal with DC voltage mixed is fed back to pin 51 of CN1. The DC voltage is detected by IC33 and low (L) level obtained at pin 1 of IC33 is fed to pins 10 and 11 of IC31and the playback video signal through Q39, IC 31(b) IC31(a) and Q38 is fed to the viewfinder.

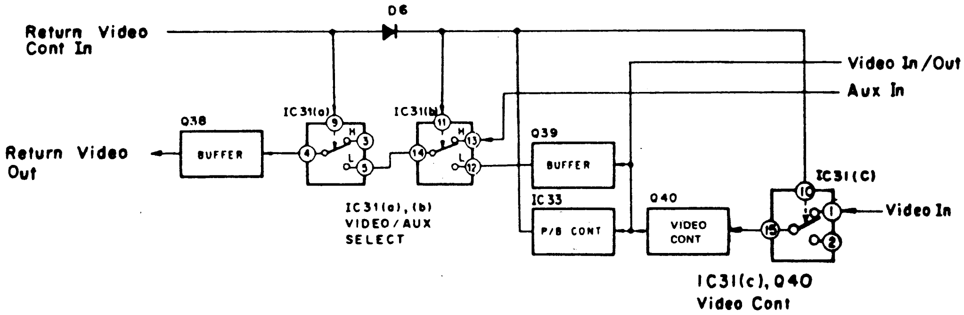

Return Video Cont In
D6
Video In/Out
Aux In
Q38
BUFFER
Return Video Out
IC31(a)
IC31(b)
IC31(a), (b) VIDEO/AUX SELECT
Q39
BUFFER
IC33
P/B CONT
Q40
VIDEO CONT
IC31(C)
Video In
IC31(c), Q40 Video Cont

Fig. 10-5 Video/ Auxiliary Selection Circuit

10-6 Y/Chroma/Video Output Circuit

This circuit consisting of IC28 through IC30, Q30 through Q37 amplifies the Y (luminance) , Chroma and composite video signal for the 1.0Vp-p/75 ohms load. respectively.

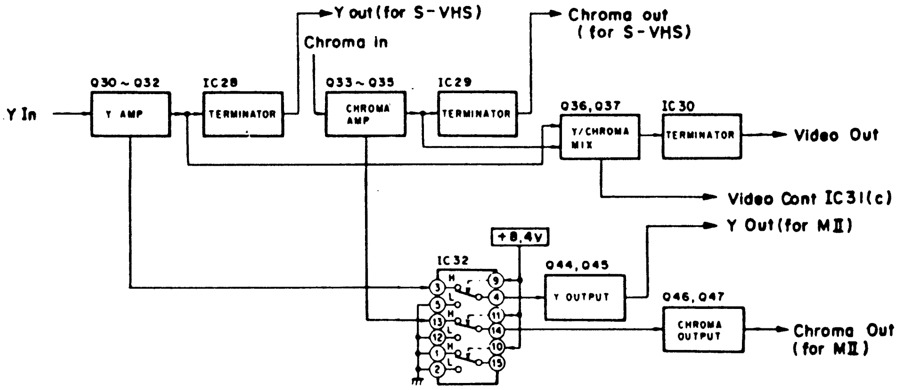

Y out (for S-VHS)
Chroma In
Chroma out (for S-VHS)
Y In
Q30~Q32
Y AMP
IC28
TERMINATOR
Q33~Q35
CHROMA AMP
IC29
TERMINATOR
Q36, Q37
Y/CHROMA MIX
IC30
TERMINATOR
Video Out
Video Cont IC31(c)
+8.4V
IC32
Q44, Q45
Y OUTPUT
Y Out (for MII)
Q46, Q47
CHROMA OUTPUT
Chroma Out (for MII)

Fig. 10-6 Y/Chroma/Video Output Circuit

Service Manual

PAL Colour Video Camera

WV-F350E Series

Vol. 2

Adjustment Procedures

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ADJUSTMENT PROCEDURE

1. TEST EQUIPMENT REQUIRED

Following equipments are required for adjustment of WV-F350.

- Test signal generator (Black burst) or special effects generator (Black burst output)
- Waveform monitor
- Vectorscope
- Oscilloscope (Dual trace, More than 100 MHz bandwidth, Delayed sweep)
- Digital voltmeter
- Frequency counter (More than 50 MHz measurable frequency range)
- Monochrome underscanned video monitor (more than 800 lines resolution)
- Color video monitor
- Logarithmic gray scale chart (YWV2310RB99)
- Color chart (YWV2100RB98)
- In-mega cycle chart (YFINMEGA-K)
- Registration/White set chart (YFV8RA0011A3)
- DC power supply (DC 10-16V, 3A or more)
- Lighting (200 footcandles (2000 lux), 3200°K)
- Lux meter
- Tripod
- Tripod mounting adaptor (WV-QT70)
- 15X power zoom lens (PH15 x 7BKRS2)
- Camera adaptor
- Extension board (YWVOEA0071AN)
- Extension board
  For Sensor board (YWVKZF250E6A)
  For Drive board (YWF250ENCH01)
  For Mother board Auto board (YWF250ENCH02)
  (YWF250ENCH03)

2. DISASSEMBLING PROCEDURE FOR ADJUSTMENT

2-1 Side Cover

- Loosen four screws which hold the side cover and remove the side cover.

(A) For left side cover (viewed from the front)

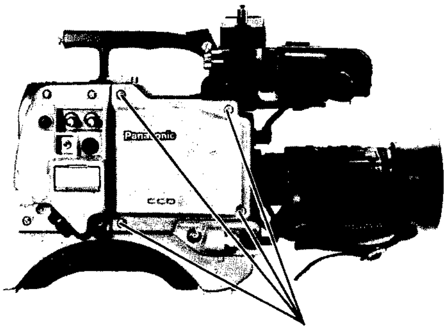


Fig. 2-1-1

(B) For right side cover (viewed from the front)

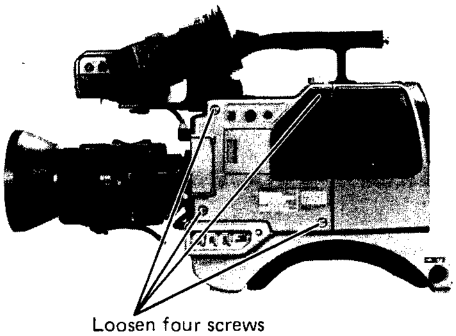


Fig. 2-1-2

2-2 Preamp Board

- Loosen two screws and remove one screw. (Fig. 2-2-1)
- Disconnect CN1, CN2, CN3 and CN4 on the Preamp Board. (Fig. 2-2-1)

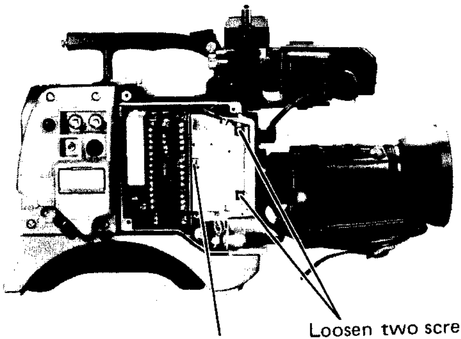


Fig. 2-2-1

2-3 Camera Adaptor

- Remove the servo control zoom lens and Electronic Viewfinder. (Fig. 2-3-1)
- Loosen two screws. (Fig. 2-3-1)

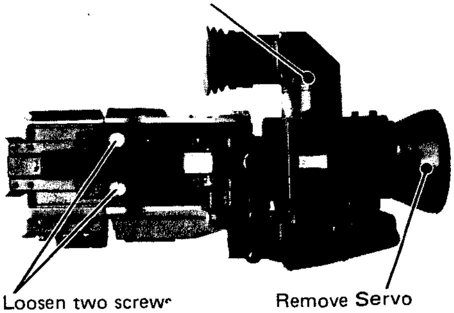


Fig. 2-3-1

- While pushing release button remove the camera adaptor by pulling it backward. (Fig. 2-3-2)

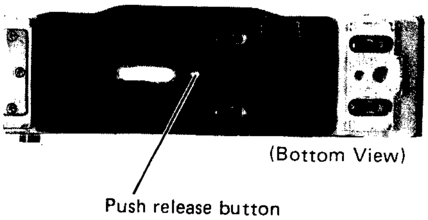

(Bottom View)
Push release button

Fig. 2-3-2

- Remove one screw holding the rear cover and four screws holding the operation cover. (Fig. 2-3-3)

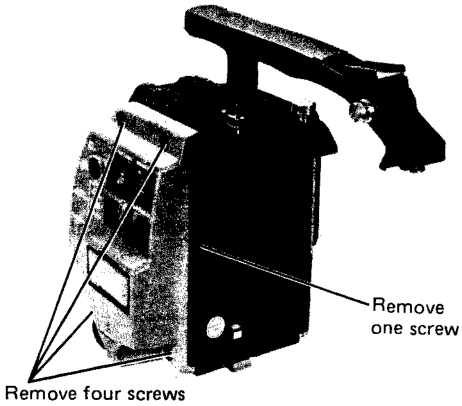

Remove one screw
Remove four screws

Fig. 2-3-3

- Pull the operation cover with the Main board to this side. (Fig. 2-3-4)

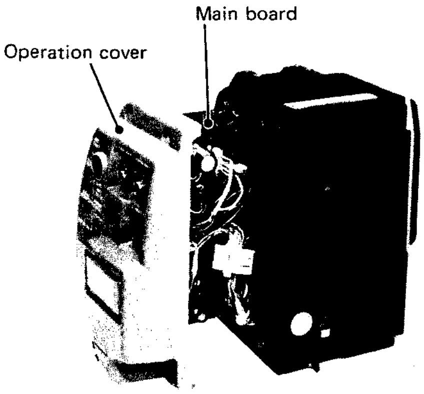

Main board
Operation cover

Fig. 2-3-4

2-4 Drive Board

- Remove two screws holding the shield case.
- Remove two of screws holding the Drive board.
- Remove the four boards (Power/ALC, SYNC/ENC, DTL/SHD and Process) from Mother board by pulling them to this side. (Fig. 2-4-1)

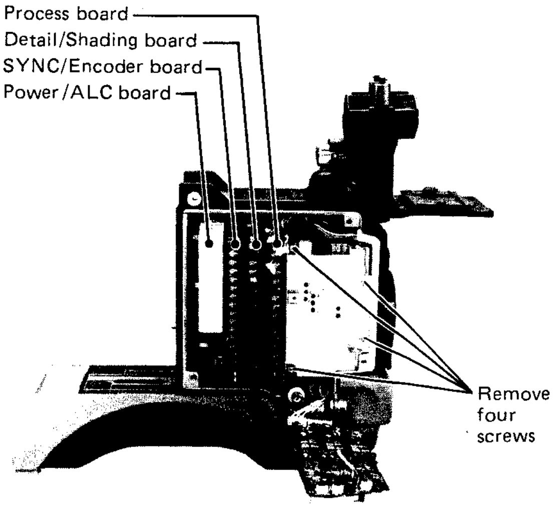

Process board
Detail/Shading board
SYNC/Encoder board
Power/ALC board
Remove four screws

Fig. 2-4-1

- Remove the Auto board from Mother board by pulling it to this side. (Fig. 2-4-2)

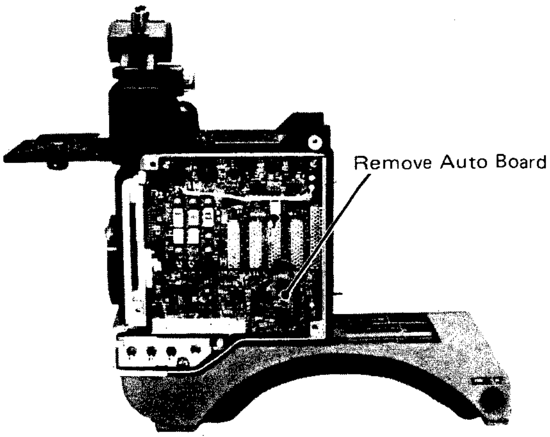

Remove Auto Board

Fig. 2-4-2

- Remove four screws holding the Mother board and remove the Motor board. (Fig. 2-4-3)

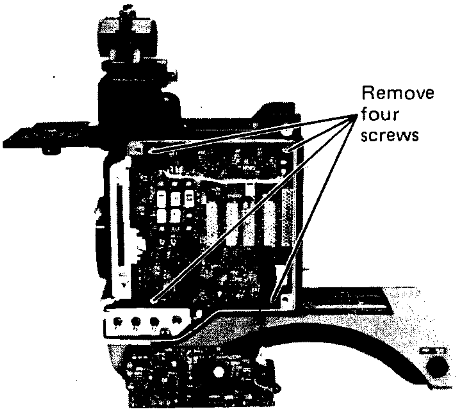

Remove
four
screws

Fig. 2-4-3

Disconnect CN101, CN108 and CN7 on the Mother board. (Fig. 2-4-4)

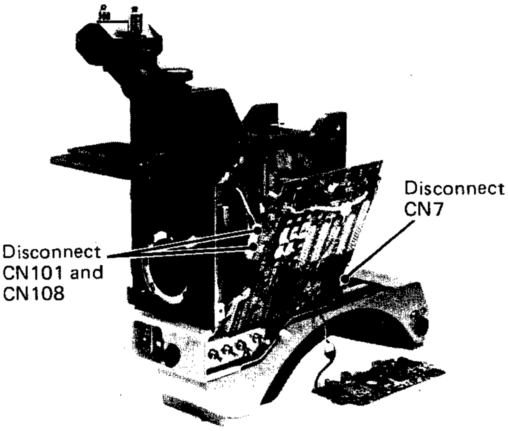
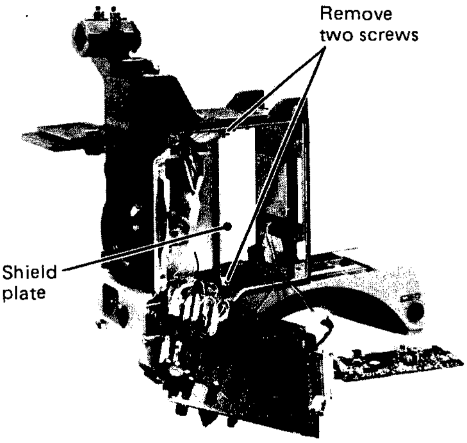

Disconnect
CN7
Disconnect
CN101 and
CN108

Fig. 2-4-4

- Remove two screws holding the shield plate and remove the shield plate. (Fig. 2-4-5)


Remove
two screws
Shield
plate

.Fig. 2-4-5

- Remove four screws holding the microphone bracket and remove the microphone bracket.
- Remove one screw holding the Drive sub board holder and remove the holder.
- Remove two screws holding the shield case and remove the shield case. (Fig. 2-4-6)

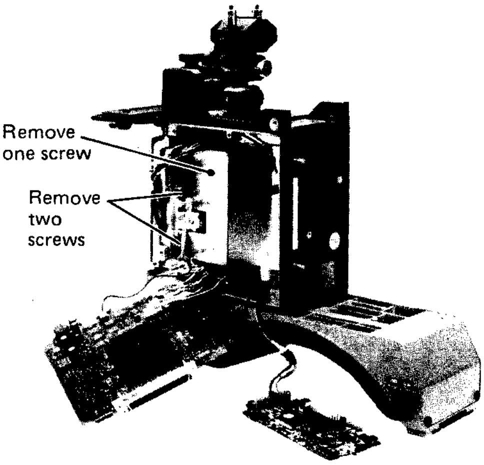

Remove
one screw
Remove
two
screws

Fig. 2-4-6

- Remove two screws holding the Drive board and remove the Drive board. (Fig. 2-4-7)

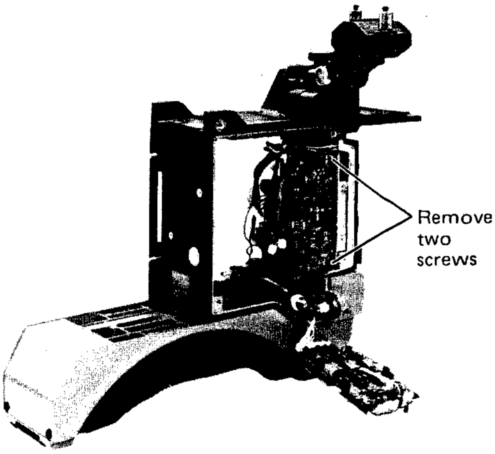

Remove
two
screws

Fig. 2-4-7

3. PRISM AND CCD ASSEMBLY REPLACEMENT

- Remove the servo control zoom lens, Electronic Viewfinder and Camera Adaptor. (Refer to 2-3 Camera Adaptor)

- Remove the shield case covering the Prism and CCD assembly. (Refer to 2-4 Drive board)

- Remove three screws holding the Electronic Viewfinder mounting angle and remove it. (Fig. 3-1)

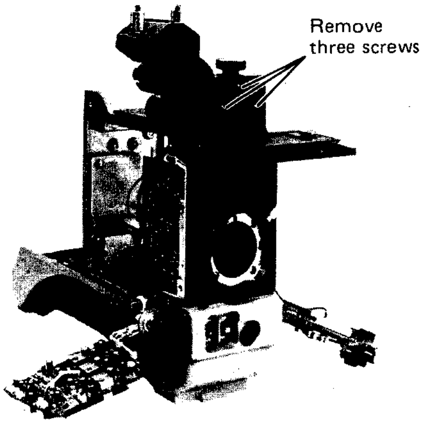

Remove
three screws

Fig. 3-1

- Remove four screws holding the bottom cover and remove the bottom cover. (Fig. 3-2)

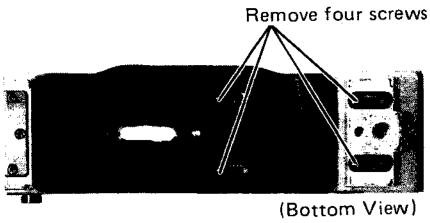

Remove four screws
(Bottom View)

Fig. 3-2

- Disconnect DC plug from the camera by pulling it. (Fig. 3-3)

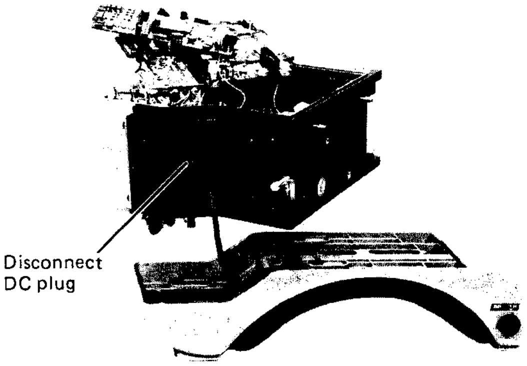

Disconnect
DC plug

Fig. 3-3

- Remove four screws holding the front cover and remove the front cover. (Fig. 3-4)

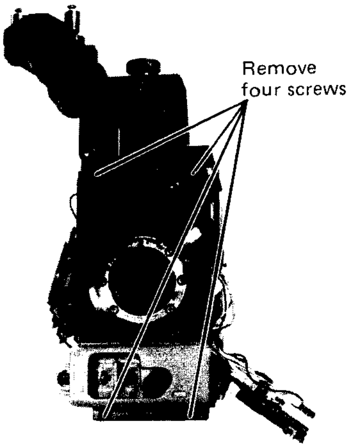

Remove
four screws

Fig. 3-4

- Remove two screws holding the Prism and CCD assembly and remove the Prism and CCD assembly. (Fig. 3-5)

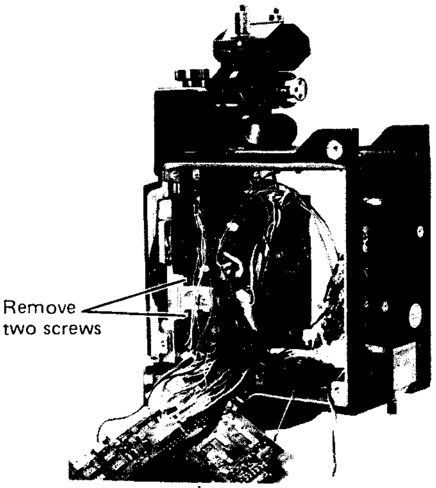

Remove
two screws

Fig. 3-5

- After replacing the Prism and CCD assembly, assemble the camera in the reverse order of dissemble.

4. ADJUSTMENT PROCEDURE

4-1 Connection and Setting Up for Adjustment

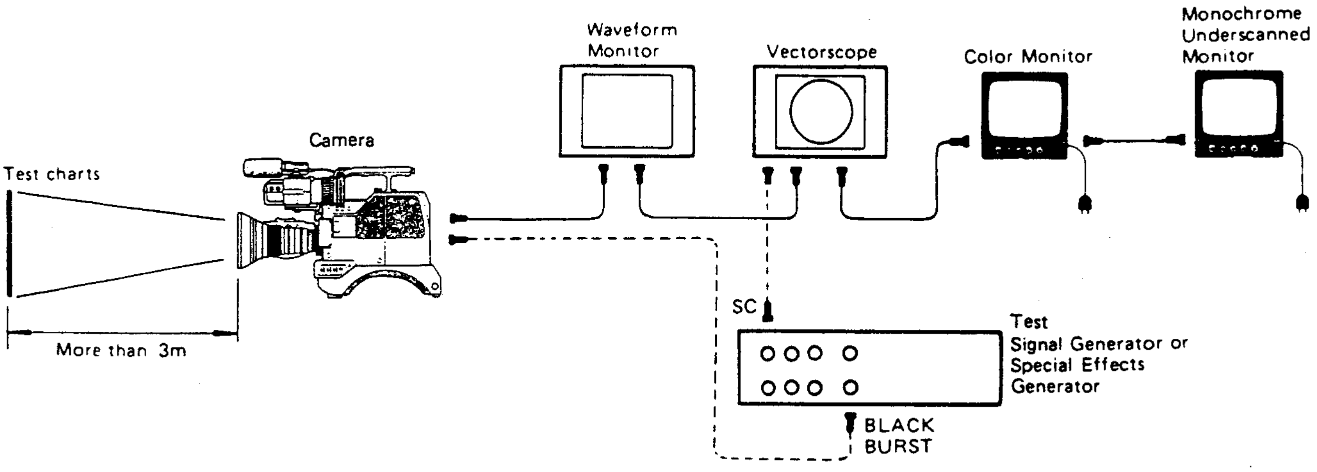


Fig. 4-1-1

Connection

- Connect the coaxial cable between the VIDEO OUTPUT connector on the right side (viewed from rear) of camera adaptor and the VIDEO INPUT connector of the waveform monitor.

- Connect the coaxial cable between the VIDEO OUTPUT connector of the waveform monitor and the VIDEO INPUT connector of the vectorscope.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the vectorscope and the VIDEO INPUT connector of the color monitor.
- Connect the coaxial cable between the VIDEO OUTPUT connector of the color monitor and the VIDEO INPUT connector of the monochrome underscanned monitor.
- Terminate the VIDEO INPUT connector of the monochrome underscanned monitor with 75 ohms.

Set up

- Turn on the camera for warming up at least 30 minutes period to adjustment.
- Distance between the camera and test chart should be 3m.
- lighting : 200 footcandles (2000 lux), incident, 3200°K.

Position of Controls and Switches on the Camera

(Left Side) Viewed from rear

Filter Wheel	1
High Gain Selection Switch	0 dB
Color Bar/Camera Selection Switch	BAR
White Balance Selection Switch	MANUAL
Power Switch	ON
Shutter ON/OFF Switch	OFF

(Mother board)

T PED	Center
R GAIN	Center
B GAIN	Center
Detail Level Selection Switch	OFF
Detail Frequency Band Selection Switch	LOW
H PHASE	Center
SC PHASE FINE	Center
SC PHASE COARSE SWITCH	2, 4
Lens Iris Control	Center
Level and Zone Indicator Switch	OFF

(Front)

Auto white/Auto Black Set Switch	HOLD
Lens Iris Selection Switch	NOR

(Right Side) Viewed from rear

Power SelectionSwitch	BATT/EXT DC
VTR COMPATIBILITY SWITCH	⊕1
Audio Monitor/intercom Level Control	Center
Audio Level Selection Switch	-20
VTR Video Output Selection Switch	ENC
Audio Monitor Selection Switch	INT

(Lens)

Iris Control Selection Switch	M (Manual)
Servo/Manual Zoom Selection Switch	MANU

4-2 Adjustment

- Refer to the LOCATION OF TEST POINTS AND ADJUSTING CONTROLS.
- Aim the camera at the test chart so that the arrow heads on the test chart just touch to the four edges of the raster on the underscanned video monitor.

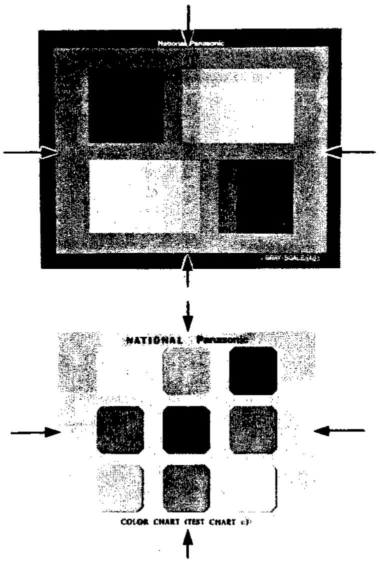

National Panasonic
GRAY SCALE (A)
NATIONAL Panasonic
COLOR CHART (TEST CHART c)

Fig. 4-2-1

■ Extension Board

- When adjusting the Process, Detail/Shading, Sync/Encoder, and Power/ALC board, use the following extension board.

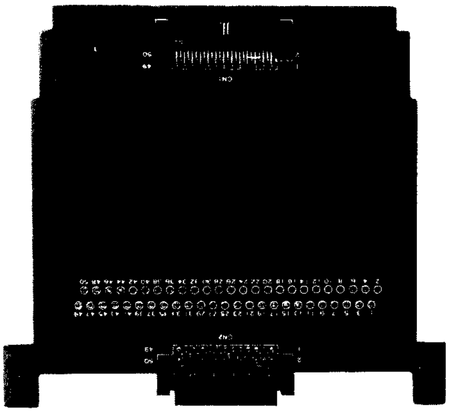


Fig. 4-2-2

■ Power/ALC Board Adjustment

(1) Switching frequency adjustment

Test point :	TP5	Power/ALC board
Adjust :	VR2(SW FREQ)	Power/ALC board

- Connect the socilloscope to TP5 (SW FREQ) on the Power/ALC board.
- Adjust VR2 so that a pulse is shift a little left point of the waveform bottom as shown Fig. 4-2-4.

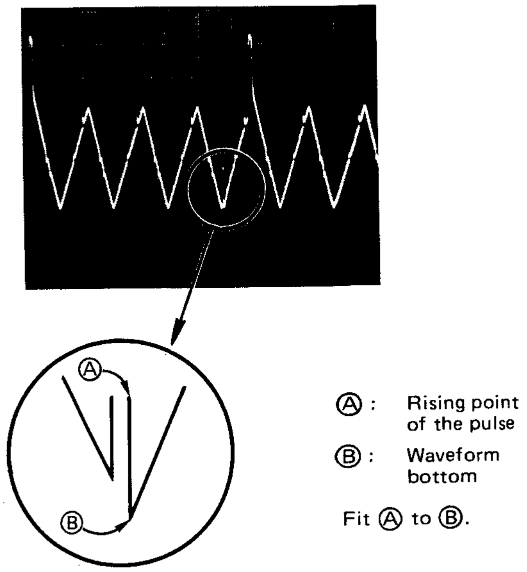

Ⓐ
Ⓑ
Ⓐ : Rising point of the pulse
Ⓑ : Waveform bottom
Fit Ⓐ to Ⓑ.

Fig. 4-2-4

(2) + 5.1V adjustment

Test points : Pin 16 or 17 of Extension board
Adjust : VR1(+ 5.1 V ADJ) Power/ALC board

- Connect the digital voltmeter to pin 16 or 17 of Extension board.
- Adjust VR3 for + 5.10 ± 0.01V

■ Sync/Encoder Board Adjustment

(3) Internal subcarrier adjustment

Test point :	TP10(SC FREQ)	Sync/Encoder board
Adjust :	CT3(SC FREQ)	Sync/Encoder board

- Connect the frequency counter to TP10.
- Adjust CT3 for 4.43361875MHz ± 5Hz

(4) Interleaving adjustment

Test point : TP4(INTER LEAVING) Sync/Encoder board
Adjust : CT1(INTER LEAVING) Sync/Encoder board

- Connect the oscilloscope to TP4.
- Set the oscilloscope to DC mode.
- Adjust CT1 so that the DC voltage becomes 2.5V ± 0.2V.

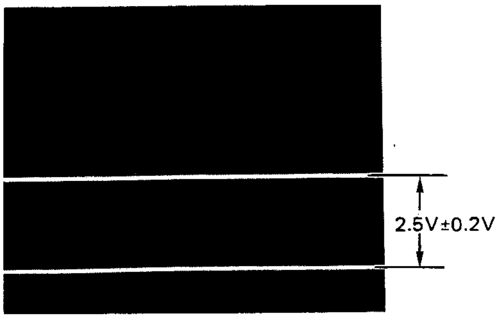


Fig. 4-2-5

- Reset the oscilloscope to AC mode.

(5) Vertical drive width adjustment

Test points : Pin 40(VD) of Extension board
Pin 43(CSYNC) of Extension board
Adjust : VR1(VD WIDTH) Sync/Encoder board

- Connect CH1 probe of the oscilloscope to pin 40 (VD) of the Extension board.
- Connect CH2 probe of the oscilloscope to pin 43 (C sync) of the Extension board.
- Set the oscilloscope mode as follows.

	CH1 (VD)	CH2(C sync)
Vertical voltage Sweep time Polarity	5V/DIV 5msec/DIV NORMAL	5V/DIV 5msec/DIV INVERT
Vertical mode Trigger source	ADD CH1 (VD)	

- Adjust Vertical position of CH1 and CH2 so that the pulses become in Fig. 4-2-6 (a).

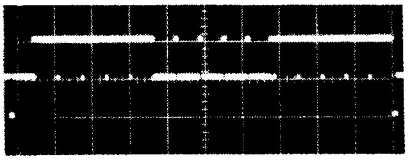
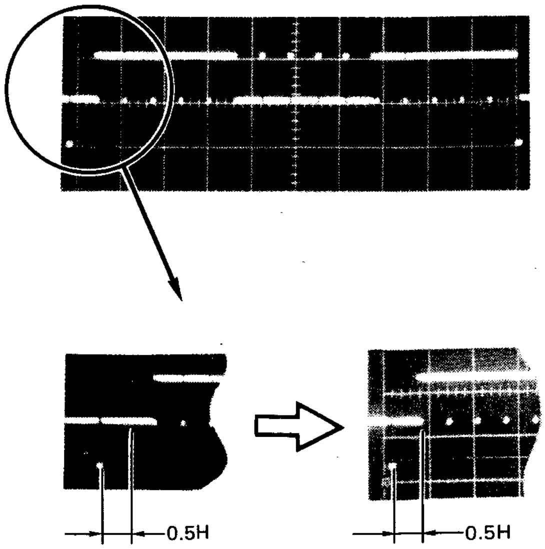


Fig. 4-2-6 (a)

- Repeat the power switch turning OFF and ON so that a period between C Sync pulse and rise point of VD pulse become 0.5H (0.5horizontal time).(Fig. 4-2-6 (b))



NO GOOD GOOD

Fig. 4-2-6 (b)

- Adjust VR1(VD WIDTH) so that the VD pulse width becomes 7.75H (7.5H-8.0H) from rise up point of VD pulse.(Fig. 4-2-6 (c))

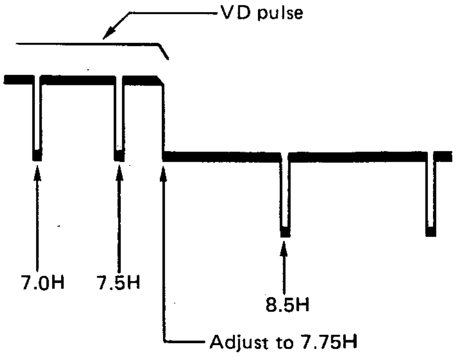


Fig. 4-2-6 (c)

(6) Color bar start adjustment

Test point : TP100(Y-1) Sync/Encoder board
Adjust : VR10(COLOR BAR START)
Sync/Encoder board

- Confirm that the Color Bar/Camera Selection Switch is set to BAR position.
- Connect the oscilloscope to TP100(Y-1) on the Sync/Encoder board.
- Set the oscilloscope at H rate.
- **Adjust the VR10(COLOR BAR START) so that the rise up point of color bar Ⓐ is set to the color bar start point Ⓑ. (Fig. 4-2-7)**

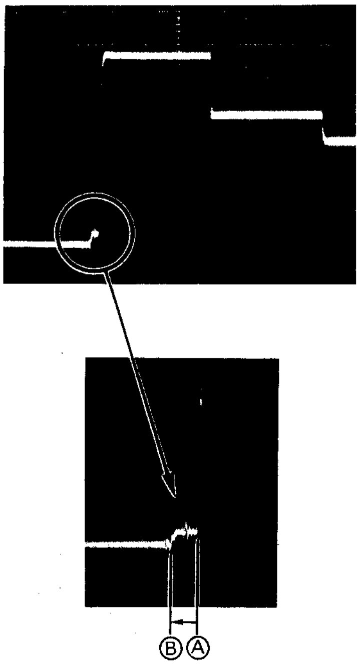


Fig. 4-2-7

(7) Color bar width adjustment

Test points : TP100(Y-1) Sync/Encoder board
Adjust : CT10(COLOR BAR WIDTH)
Sync/Encoder board
Observe : Oscilloscope

- **Confirm that the Color Bar/Camera Selection Switch is set to BAR position.**
- Connect the oscilloscope to TP100(Y-1) on the Sync/Encoder board.
- Set the oscilloscope at H rate.
- **Adjust CT10 so that the width of black portion becomes 6.0µsec +0.2 -0.1µsec.**

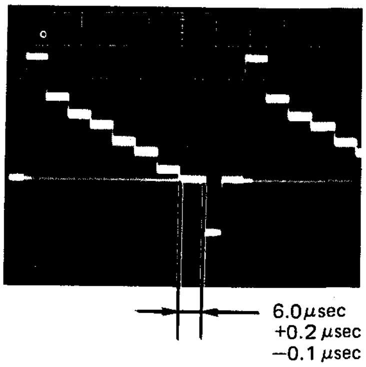


Fig. 4-2-8

(8) U/V (B-Y/R-Y) black balance/White balance adjustment

Test point : VIDEO OUTPUT connector
Adjust : VR14(V CARRIER BAL) Sync/Encoder board
VR15(U CARRIER BAL) Sync/Encoder board
VR21(V WHITE BAL) Sync/Encoder board
VR24(U WHITE BAL) Sync/Encoder board

- Connect the vectorscope to VIDEO OUTPUT connector.
- Aim the Camera at the logarithmic gray scale chart.
- Set the gain of vectorscope to maximum.
- Adjust VR14 and VR 15 so that the vector positions at the center of the vectorscope.
- Adjust VR21 and VR24 so that the vector positions at the center of the vectorscope.

(9) Bar pedestal adjustment

Test point : VIDEO OUTPUT connector
Adjust : VR19(BAR PED) Sync/Encoder board

- Connect the oscilloscope terminated with 75 ohms to VIDEO OUTPUT connector.
- Set the oscilloscope at H rate.
- Adjust VR19 so that the setup level (black level) becomes 0V ±0.01V.

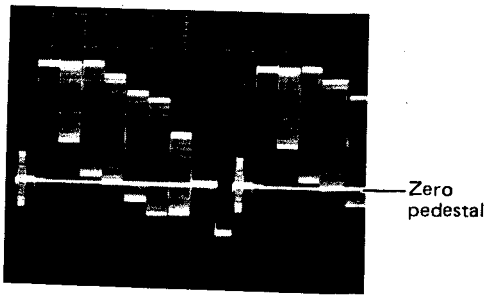


Fig.4-2-9

(10) MII Y gain, R-Y gain, B-Y gain adjustment

Test points : TP100(Y-1) Sync/Encoder board
TP105(R-Y) Sync/Encoder board
TP106(B-Y) Sync/Encoder board
Adjust : VR11(Y GAIN) Sync/Encoder board
VR23(R-Y GAIN) Sync/Encoder board
VR25(B-Y GAIN) Sync/Encoder board

- **Confirm that the Color bar/Camera Selection Switch is set to BAR position.**

a : MII Y gain adjustment
- Connect the oscilloscope to TP100.
- Set the oscilloscope at H rate.
- Adjust VR11 so that the white bar signal level becomes 0.7V ±0.02V.

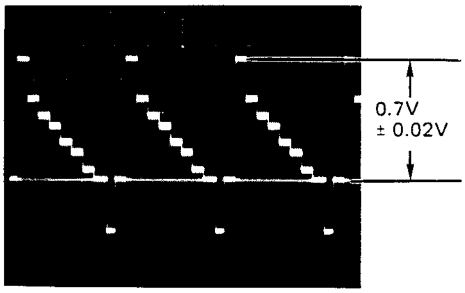


Fig.4-2-10

b : R-Y gain adjustment
- Set the RCU/VTR Signal Selection Switch on the side of Camera Adaptor to Y/P_R/P_B position.
- Connect the oscilloscope to TP105.
- Set the oscilloscope at H rate.
- Adjust VR23 so that the setup level becomes 0.525V ±0.02V.

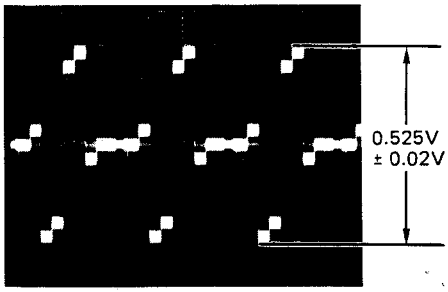


Fig.4-2-11

C : B-Y gain adjustment
- Set the RCV/VTR Signal Selection Switch on the side of Camera Adaptor to Y/P_R/P_B position.
- Connect the oscilloscope to TP106.
- Set the oscilloscope at H rate.
- Adjust VR25 so that the setup level becomes 0.525V ±0.02V.

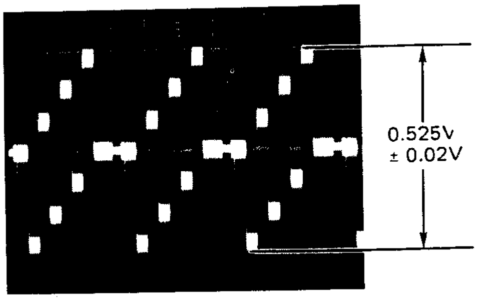


Fig.4-2-12

(11) MONITOR OUT Ygain adjustment

Test point : MONITOR OUTPUT connector
Adjust : VR28(MONITOR OUT Y GAIN)
Sync/Encoder board

- Connect the oscilloscope terminated with 75ohms to MONITOR OUTPUT connector.
- Set the oscilloscope at H rate.
- Adjust VR28 so that the White bar signal level becomes 0.7V ±0.02V. (Fig.4-2-13)

(12) Ygain and Synclevel Adjustment

Test point : VIDEO OUTPUT connector
Adjust : VR12(VIDEO OUT Y GAIN)
Sync/Encoder board
VR17(SYNC LEVEL) Sync/Encoder board

- Connect the oscilloscope terminated with 75ohms to VIDEO OUTPUT connector.
- Set the oscilloscope at H rate.
- Adjust VR12 so that the White bar signal level becomes 0.7 ±0.02V.
- **Adjust VR17 so that the sync level becomes 0.3 ±0.007V.** (Fig. 4-2-13)

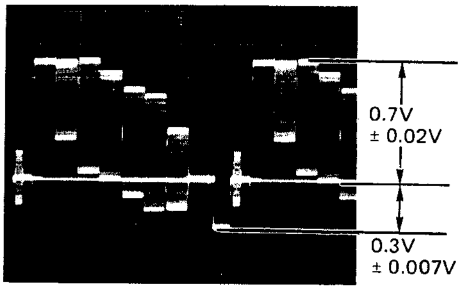


Fig. 4-2-13

(13) SC/H, burst gain adjustment

Test point :	VIDEO OUTPUT connector	
Adjust :	VR20(CHROMA)	Sync/Encoder board
	VR22(R-Y LEVEL)	Sync/Encoder board
	VR27(BURST GAIN)	Sync/Encoder board
	VR16(BURST ϕ)	Sync/Encoder board
	VR4(SUB QUAD)	Sync/Encoder board
	VR3(SC-H)	Sync/Encoder board
	VR2(QUAD)	Sync/Encoder board
	VR29(BURST QUAD)	Sync/Encoder board
Observe :	Vectorscope	

- Confirm that the Color Bar/Camera Selection Switch is set to BAR position.
- Connect the rectorscope to VIDEO OUTPUT connector.
- **Set the vectorscope to vector + SC/H mode.**
- Set the vectorscope to NTSC mode.
- Set the V ON/OFF Switch SW1 on the Sync/Encoder board to OFF position.
- **Set the U ON/OFF Switch SW2 on the Sync/Encoder board to ON position.**
- **Adjust VR16 (BURST ϕ) so that two vectors are fit in phase.(Fig. 4-2-14)**

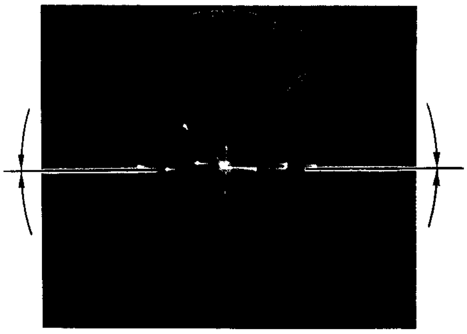


Fig. 4-2-14

- **Adjust VR3 (SC-H) so that the SC/H phase becomes 180°. ± 5°. (Fig. 4-2-15)**

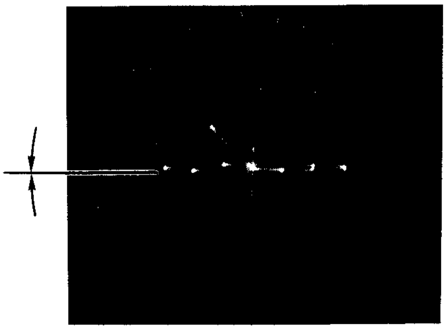


Fig. 4-2-15

- Set the V ON/OFF Switch SW1 to ON position.
- Set the U ON/OFF Switch SW2 to OFF position.
- Adjust VR4 (SUB QUAD) and VR2 (QUAD) so that two vectors are fit to V axis on the vectorscope.

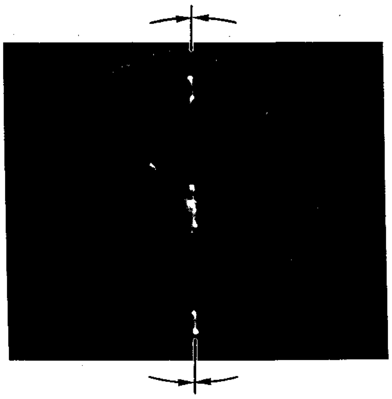


Fig. 4-2-16

- Set the V ON/OFF Switch SW1 to OFF position.
- Set the U ON/OFF Switch SW2 to ON position.
- **Adjust VR29 so that two burst signals are fit to burst axis on the vectorscope. (Fig. 4-2-17)**

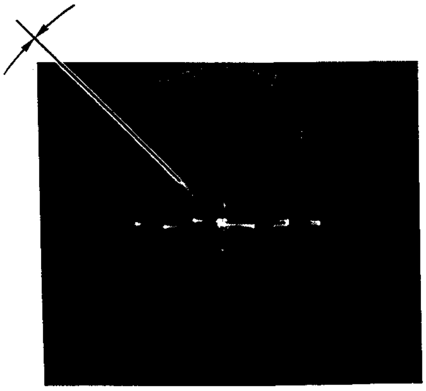


Fig. 4-2-17

- Set the V ON/OFF Switch SW1 to ON position.
- Set the U ON/OFF Switch SW2 to ON position.
- **Set the vectorscope to PAL mode.**
- **Adjust VR29 (BURST QUAD) so that burst vector becomes 90° ± 1° on the vectorscope. (Fig. 4-2-18)**

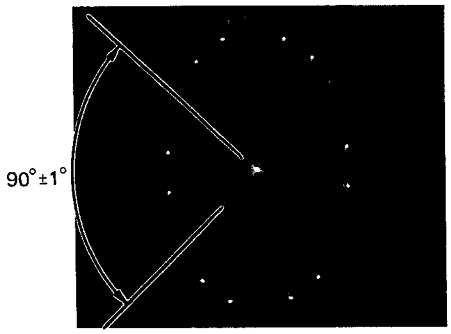


Fig. 4-2-18

- Repeat above procedure until the error of each adjustment becomes minimum.
- Adjust VR20 (CHROMA) and VR22 (R-Y LEVEL) so that all vectors fall into their respective boxes. (Fig. 4-2-19)

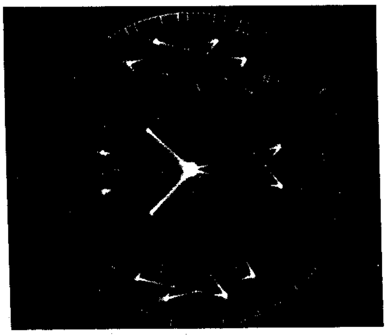


Fig. 4-2-19

- Adjust VR27 (BURST GAIN) so that burst signal level becomes $0.3V_{P\text{-}P} \pm 0.007V$. (Fig. 4-2-20)

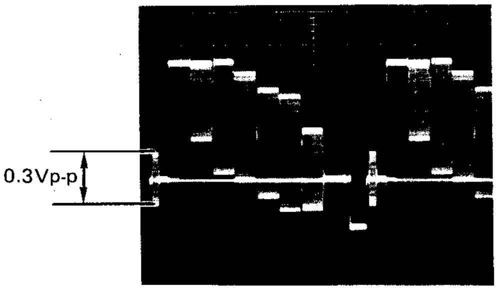


fig. 4-2-20

- Confirm that the above adjustment is correct or not when the Sync/Encoder board is set in the camera head.

(14) Monitor chroma gain adjustment

Test point : MONITOR OUTPUT connector
Adjust : VR13(MONITOR CHROMA) Sync/Encoder board
Observe : Vectorscope

- Connect the vectorscope to MONITOR OUTPUT connector.
- Adjust VR13 (MONITOR CHROMA) so that all vectors fall into their respective boxes. (Fig. 4-2-19)

(15) Horizontal lock adjustment

Test point : TP5(H LOCK) Sync/Encoder board
Adjust : L2(H LOCK) Sync/Encoder board

- Supply the black bust signal or color bar signal to GEN-LOCK INPUT connector on the camera adaptor from Test signal generator or S.E.G.
- Set VRs that VR5 (H PHASE), VR8(H PHASE LIMIT), VR4(SC FINE), VR7(SC PHASE LIMIT) on the Mother board to mechanical center position.
- Connect the oscilloscope to TP5.
- Set the oscilloscope at H rate.
- Adjust L2 so that the DC voltage becomes 2.5V ±0.1V. (Fig. 4-2-21)

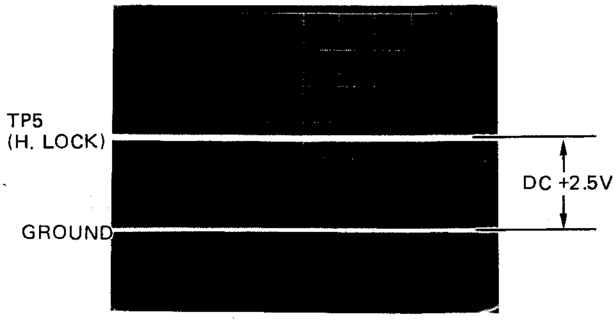


Fig. 4-2-21

(16) H. phase adjustment

Test points :	Pin17(G/L IN) of Extension board	
	TP102(MONITOR OUT)Sync/Encoder board	
Adjust :	VR5(H PHASE)	Mother board
	VR8(H PHASE LIMIT)	Mother board

- Supply the black burst signal or color bar signal to the GEN-LOCK INPUT connector on the camera adaptor from the Test Signal Generator or S.E.G.
- Connect the 2 Probes of the oscilloscope to Pin 17 (G/L in) of Extension board and TP102 (MONITOR OUT).
- Set the oscilloscope to H rate and dual display.
- Expand the H sync period on the oscilloscope.

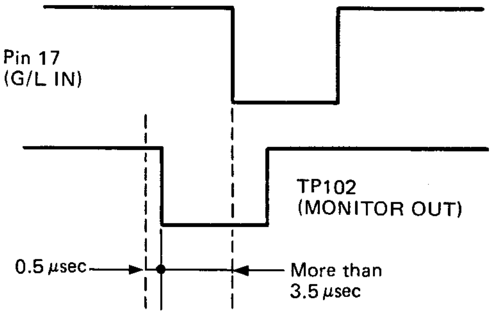


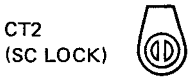
Fig. 4-2-22

- Set VR5 to fully clockwise.
- Adjust VR8 so that the sync signal of gen-lock is lagged 0.5 μsec behind the sync signal of Monitor Out.
- Confirm that the sync signal of gen-lock is leads more than 3.5 μsec over the sync signal of Monitor Out when turning VR5 fully counterclockwise. (Fig. 4-2-22)

(17) SC lock adjustment

Test point :	TP11(PD)	Sync/Encoder board
Adjust :	CT2(SC LOCK)	Sync/Encoder board
	L5(SC LOCK)	Sync/Encoder board

- Connect the oscilloscope to TP 11.
- Set the oscilloscope to DC mode.
- Set CT2 (SC LOCK) to below position.



- Turn L5 (SC LOCK) so that DC voltage becomes maximum.
- Adjust CT2 so that DC voltage becomes 2.0V ± 0.1V. (Fig. 4-2-23)

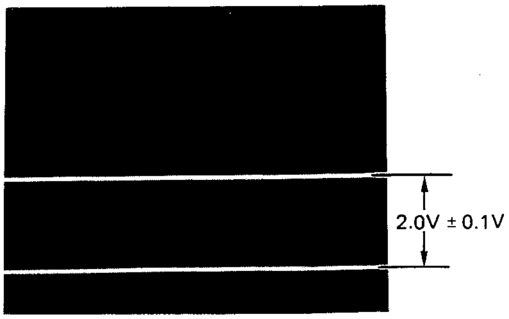


Fig. 4-2-23

(18) Subcarrier phase adjustment

Adjust :	VR4(SC FINE)	Mother board
	VR7(SC PHASE LIMIT)	Mother board
	SW7	Mother board
	(SC PHASE COARSE-1 SWITCH)	
	SW8	Mother board
	(SC PHASE COARSE-2 SWITCH)	
Observe :	Vectorscope	

- Supply the black burst signal or color bar signal to the GEN-LOCK INPUT connector on the camera adaptor from the test signal Generator or S. E. G.
- Supply an external subcarrier signal to the external subcarrier reference (EXT CW 0REF) connector of the vectorscope from the Test Signal Generator or S. E. G.
- Set the burst mode (0REF) of the vectorscope to EXT position.
- Set SC PHASE COARSE-1 SWITCH SW7 to 2 position.
- Set SC PHASE COARSE-2 SWITCH SW8 to 4 position.
- Turn VR4 fully counter clockwise.
- Adjust phase control of vectorscope so that burst phase positions 0° (U axis).

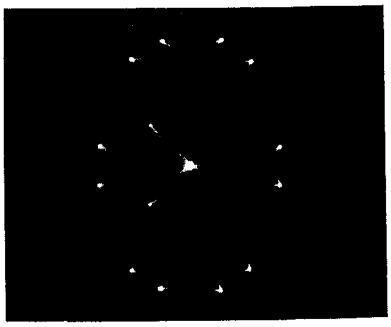


Fig.4-2-24

- Turn VR4 fully clockwise.
- Turn VR7 clockwise and set to the position that the dots of the vector on the vectorscope are stability status.
- Turn VR4 fully counter Clockwise and confirm that burst phase delays more than 90°. (approx.92°~95°)

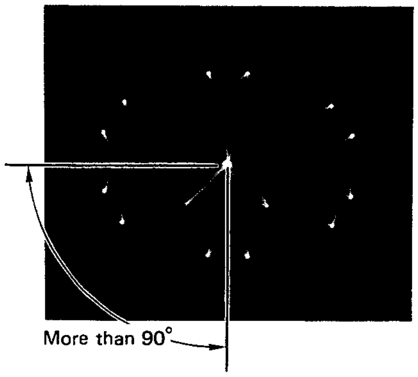


Fig.4-2-25

- Confirm that the burst phase changes more than 90°, 180° and 270° when SW7 and SW8 are set to 90°, 180° and 270° position.
- Confirm that the burst phase changes 90° when VR4 is turned back.
  (The burst phase changes more than 360° by setting SW7, SW8 and VR4.)
- Reset SW7 and SW8 to 0° position and return VR4 to its mechanical center.
- Disconnect the black burst signal or color bar signal from the GEN-LOCK INPUT connector, and the external subcarrier signal from the vectorscope.

■ Auto Board Adjustment

This adjustment will be needed when replacing the Auto board.

a : Connection of E1 from the Battery board.

- Connect the Auto board to the Mather board With CN11 and CN12.
- Set the Power Switch of Camera to ON position more than 3 seconds.
- Set the Power Switch of Camera to OFF position.
- Remove the Auto board from the Mother board.
- Connect E1 to Auto board soldering the terminals in less than 10 minutes after the Power Switch is set to OFF position.

b : Confirm of back up current

- Connect the digital voltmeter to TP1 (BACK UP CURRENT ⊕) AND TP2 (BACK UP CURRENT ⊖)
- Confirm that the voltage is less than 5.7 mV when Power Switch of camera is set to ON or OFF position.

(19) Auto preset

- Set Power Switch to ON position.
- Set Colour Bar/-6dB/Camera Selection Switch to Camera position.
- Short the preset pattern A to B.
- Short the preset pattern C to D.

(20) Flange-back adjustment(Lens)

Adjust : Flange-back-adjustment ring
Observe : Monochrome underscanned video monitor

- Set the wheel to 1 (3200°K) position.
- Loosening the flange-back lock knob.
- Set the lens iris to fully open in order to have minimum depth of focus. if the picture on the monochrome underscanned video monitor is saturated, set the filter wheel to 2 (5600°K + 12.5% ND) position.
- Aim the camera at the resolution chart further than 10 feet (3m) from the camera.
- Zoom in (close up) and adjust lens focus while observing the monochrome underscanned video monitor.
- Zoom out (wide angle) and adjust the focus by turning the flange-back adjustment ring.
- Zoom in again and adjust the lens focus by turning the focus ring.
- Zoom out again and if necessary adjust the focus with the flange-back adjustment ring.
- Repeat this procedure until correct focus is maintained throughout the entire zoom range. When the adjustment has been completed, tighten the flange-back lock knob.

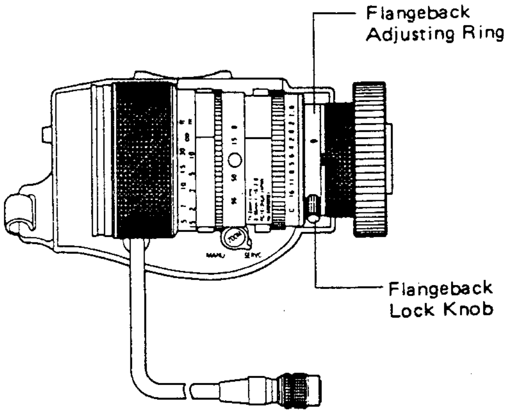


Fig. 4-2-26

■ Preamplifier Board Adjustment

(21) DC bias voltage adjustment

Test points :	TP6(R OUT)	Preamplifier board
	TP7(G OUT)	Preamplifier board
	TP8(B OUT)	Preamplifier board
Adjust :	VR101(R DC BIAS)	Preamplifier board
	VR201(G DC BIAS)	Preamplifier board
	VR301(B DC BIAS)	Preamplifier board

- Confirm the Shutter ON/OFF Switch is OFF position.
- Cap on the lens.
- Connect the oscilloscope to TP6.
- Connect the oscilloslope to DC position at H rate.
- Adjust VR101 so that the voltage at the optional black portion of R signal at TP6 becomes 0.4V ± 0.01V. (Fig. 4-2-26)

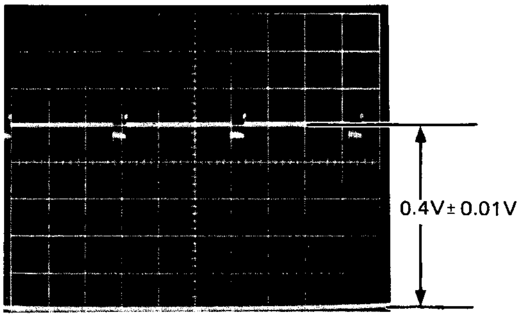


Fig. 4-2-26

- Connect the oscilloscope to TP7.
- Adjust VR201 so that the DC voltage at the optical black portion of G signal at TP7 becomes 0.4V. (Fig. 4-2-26)
- Adjust VR301 so that the DC voltage at the optical black portion of B signal at TP8 becomes 0.4V. (Fig. 4-2-26)

■ Drive Board Adjustment

(22) Output gain adjustment

Test points :	TP6(R OUT)	Preamplifier board
	TP7(G OUT)	Preamplifier board
	TP8(B OUT)	Preamplifier board
Adjust :	VR5(R OG)	Drive board
	VR4(G OG)	Drive board
	VR3(B OG)	Drive board
	VR8(R SUB)	Drive board
	VR7(G SUB)	Drive board
	VR6(B SUB)	Drive board

- Aim the camera at logarithmic gray scale chart.
- Set the lens iris to fully open.
- Connect the oscilloscope to TP6.
- Set the oscilloscope at H rate.
- Adjust VR8(R SUB) and VR5(R OG) so that the logarithmic gray scale is clipped three step from top of the logarithmic gray scale.
- Adjust VR5 so that the waveform becomes maximum level. (Fig. 4-2-27 Ⓐ)

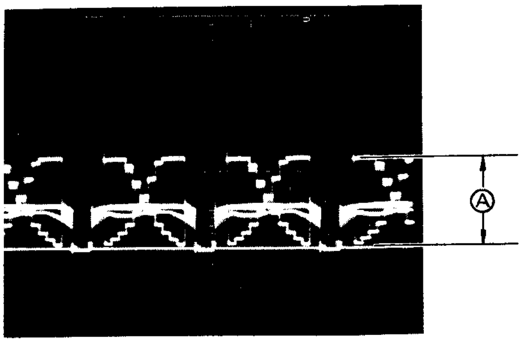


Fig. 4-2-27

- Adjust VR7(G SUB) and VR4(G OG) at TP7(G OUT) similarly.
- Adjust VR6(B SUB) and VR3(B OG) at TP8(B OUT) similarly.

(23) V SUB adjustment

Test points :	TP6(R OUT)	Preamplifier board
	TP7(G OUT)	Preamplifier board
	TP8(B OUT)	Preamplifier board
	TP10(G CCD OUT)	Preamplifier board
Adjust :	VR8(R SUB)	Drive board
	VR7(G SUB)	Drive board
	VR6(B SUB)	Drive board

- Aim the camera at logarithmic gray scale chart.
- Set the lens iris to fully open.
- Connect the oscilloscope to TP10(G CCD OUT)
- Set the oscilloscope at H rate with 20 MHz filter.
- Adjust VR7 (G SUB) so that the signal saturation level becomes 700mV. (Fig. 4-2-28)

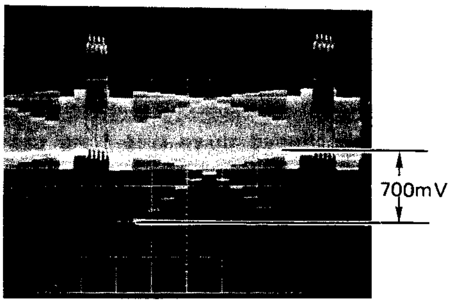


Fig. 4-2-28

- Connect the oscilloscope ch1 to TP7(G OUT).
- Connect the oscilloscope ch2 to TP6(R OUT).
- Set the oscilloscope at H rate and vertical range of ch2 to variable mode.
- Adjust VR8(R SUB) and vertical level of the oscilloscope ch2 so that the R signal waveform TP6 is fitted to G signal waveform TP7. (Fig. 4-2-29)

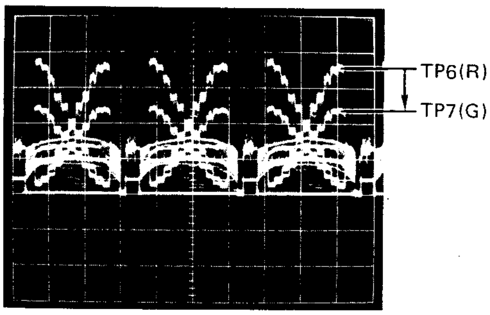


Fig. 4-2-29

- Connect the oscilloscope ch1 to TP7(G OUT).
- Connect the oscilloscope ch2 to TP8(B OUT).
- Set the oscilloscope at H rate and vertical range of ch2 to Variable mode.
- Adjust VR6(B SUB) and vertical level of the oscilloscope ch2 so that the B signal waveform TP8 is fitted to G signal waveform TP7.

■ Process Board Adjustment

For the adjustment of Process, Detail/Shading, Power/ALC and Auto boards, the condition of adjustment should be as follows unless instructed.

Set up

- Distance between the camera and test chart should be 3m.
- Lighting : 2000 lux, incident, 3200°K.

Position of Controls and Switches

(Process board)

Set to fully clockwise

VR4	(R WHITE CLIP)
VR11	(G WHITE CLIP)
VR17	(B WHITE CLIP)
VR3	(R FLARE OFFSET)
VR10	(G FLARE OFFSET)
VR16	(B FLARE OFFSET)
HIC2 VR3	(R KNEE SLOPE)
HIC4 VR3	(G KNEE SLOPE)
HIC6 VR3	(B KNEE SLOPE)

Set to fully counter clockwise

HIC2 VR1	(R KNEE POINT)
HIC4 VR1	(G KNEE POINT)
HIC6 VR1	(B KNEE POINT)
VR34	(R + 18dB SHTR FLARE)
VR36	(G + 18dB SHTR FLARE)
VR38	(B + 18dB SHTR FLARE)

The other VRs are set to mechanical center.

SW1 (GAMMA ON/OFF)	ON
SW2 (MATRIX ON/OFF)	ON
SW3 (KNEE ADJ)	ON

(Detail/Shading board)

SW1 (1H PASS)	PASS

(Mother board)

VR1 (TOTAL PEDESTAL)	CENTER
VR2 (R GAIN)	CENTER
VR3 (B GAIN)	CENTER
SW1 (SHUTTER ON/OFF)	OFF
SW6 (DTL LEVEL)	OFF
SW11 (MATRIX ON/OFF)	OFF

(Auto board)

Preset status

(Side of Camera)

High Gain Selection Switch	0 dB
White Balance Selection Switch	MANUAL
Color Bar/Camera Selection Switch ..	CAM
Filter Wheel	(1)

(Front of Camera)

Lens Iris Selection Switch	NOR

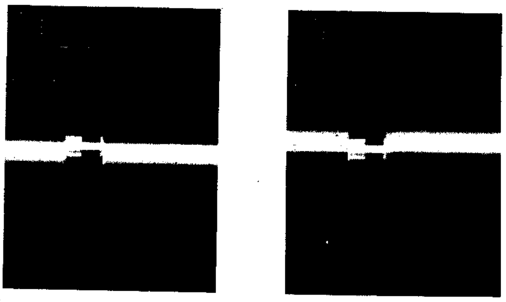
IMPORTANT NOTICE

Preset the memory in the AUTO board by shorting the 4 preset pattern A to B and shorting the preset pattern C to D on the Auto board for the following adjustment and do not set the Auto White and Black Balance setting switch (AWC, ABC) on the front panel throughout the adjustment.

(24) R/G/B Pulse cancel adjustment

Test points :	TP2(R GAIN)	Process board
	TP8(G GAIN)	Process board
	TP14(B GAIN)	Process board
Adjust :	VR21(R PULSE CANCEL)	Process board
	VR23(G PULSE CANCEL)	Process board
	VR25(B PULSE CANCEL)	Process board

- Set the filter wheel to 4(close)position.
- Connect the oscilloscope to TP2.
- Adjust VR21 so that the pedestal level becomes 0V. (Fig. 4-2-30)



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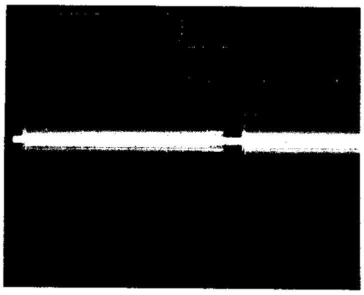


GOOD

Fig. 4-2-30

- Connect the oscilloscope to TP8.
- Adjust VR23 so that the pedestal level becomes 0V. (Fig. 4-2-30)
- Connect the oscilloscope to TP14.
- Adjust VR25 so that the pedestal level becomes 0V. (Fig. 4-2-30)

(25) R/G/B Flare offset adjustment

Test points :	TP22(R FLARE OUT)	Process board
	TP23(G FLARE OUT)	Process board
	TP24(B FLARE OUT)	Process board
Adjust :	VR3(R FLARE OFFSET)	Process board
	VR10(G FLARE OFFSET)	Process board
	VR16(B FLARE OFFSET)	Process board

- Set the filter wheel to 4 (CLOSE) position.
- Turn VR2(R FLARE GAIN), VR9(G FLARE GAIN) and VR15(B FLARE GAIN) fully clockwise.
- Connect the oscilloscope to TP22.
- Adjust VR3 so that the pedestal level becomes 0V. (Fig. 4-2-30)
- Connect the oscilloscope to TP23.
- Adjust VR10 so that the pedestal level becomes 0V. (Fig. 4-2-30)
- Connect the oscilloscope to TP24.
- Adjust VR16 so that the pedestal level becomes 0V. (Fig. 4-2-30)
- Turn VR2, VR9 and VR15 fully counter clockwise.

(26) R/G/B pedestal adjustment

Test points :	TP6(R OUT)	Process board
	TP12(G OUT)	Process board
	TP18(B OUT)	Process board
Adjust :	VR27(R PEDESTAL LEVEL)	Process board
	VR28(G PEDESTAL LEVEL)	Process board
	VR29(B PEDESTAL LEVEL)	Process board

- Set the filter wheel to 4(CLOSE) position.
- Set VR4(R GAMMA), VR11(G GAMMA) and VR17(B GAMMA) to mechanical center.
- Set the Gamma ON/OFF Switch on the Process board to ON position.
- Connect the oscilloscope to TP12(G OUT).
- Adjust VR28(G PEDESTAL LEVEL) so that the pedestal level becomes 35mV.

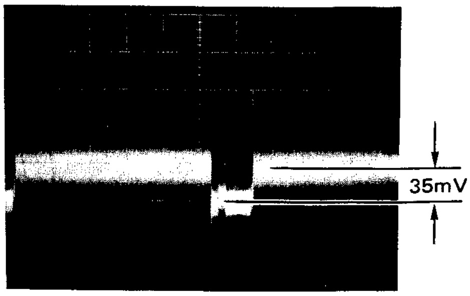


Fig. 4-2-31

- Adjust VR27(R PEDESTAL LEVEL) and VR29(B PEDESTAL LEVEL) so that the vector positions at the center of the vectorscope.

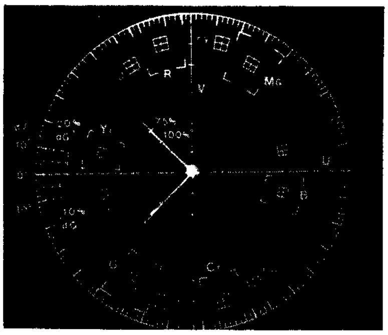


Fig. 4-2-32

(27) Lens iris setting

Test point :	TP10(G CCD OUT)	Preamplifier board
Adjust :	Lens iris	

- Aim the camera at logarithmic gray scale chart that the lighting is 2000 lux, 3200°K.
- Connect the oscilloscope to TP10.
- Set the oscilloscope with 20MHz filter.
- Adjust the lens iris so that the set up level becomes 170mV.

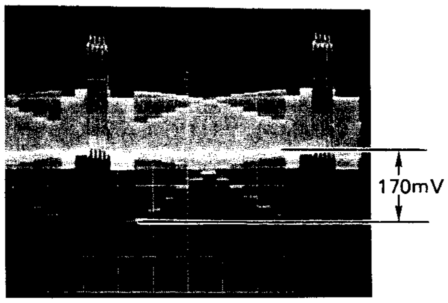


Fig.4-2-33

(28) Output gain adjustment

Test points :	TP6(R FLARE OUT)	Process board
	TP12(G FLARE OUT)	Process board
	TP18(B FLARE OUT)	Process board
Adjust :	VR1(R INPUT GAIN)	Process board
	VR41(R DL GAIN)	Process board
	VR8(G INPUT GAIN)	Process board
	VR42(G DL GAIN)	Process board
	VR14(B INPUT GAIN)	Process board
	VR43(B DL GAIN)	Process board

- Aim the camera at logarthmic gray scale chart.
- Turn VR4(R GAMMA), VR11(G GAMMA) and VR17(B GAMMA) fully clockwise.
- Connect the oscilloscope to TP6.
- Set the oscilloscope at H rate.
- Set the GAMMA ON/OFF Switch to OFF position.
- Adjust VR1 so that the waveform level becomes 0.7V.

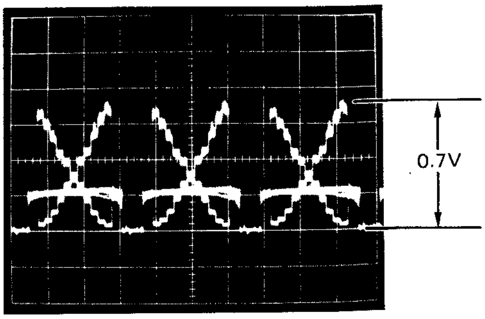


Fig. 4-2-34

- Set the GAMMA ON/OFF Switch to ON position.
- Adjust VR41 so that the waveform level becomes 0.7V.

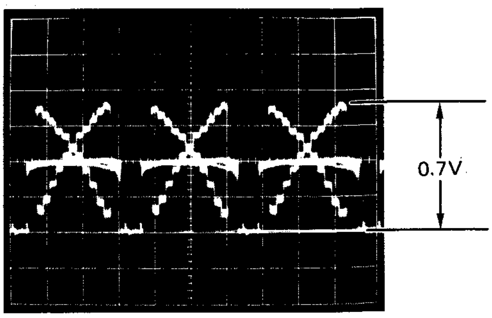


Fig. 4-2-35

- Adjust VR1 and VR41 so that two waveforms become same level when the GAMMA ON/OFF Switch ON and OFF.
- Set the GAMMA ON/OFF Switch to OFF position.
- Adjust VR8 so that the waveform level becomes 0.7V. (Fig. 4-2-34)
- Set the GAMMA ON/OFF Switch to ON position.
- Adjust VR42 so that the waveform level becomes 0.7V. (Fig. 4-2-35)
- Adjust VR8 and VR42 so that two waveforms become same level when the GAMMA ON/OFF Switch ON and OFF.
- Set the GAMMA ON/OFF Switch to OFF position.
- Adjust VR14 so that the waveform level becomes 0.7V. (Fig.4-2-34)
- Set the GAMMA ON/OFF Switch to ON position.
- Adjust VR43 so that the waveform leveln becomes 0.7V. (Fig. 4-2-35)

- Adjust VR14 and VR43 so that two waveforms become same level when the GAMMA ON/OFF Switch ON and OFF.
- Set VR4, VR11 and VR17 to mechanical center position.

(29) Gain up / shutter flare offset adjustment

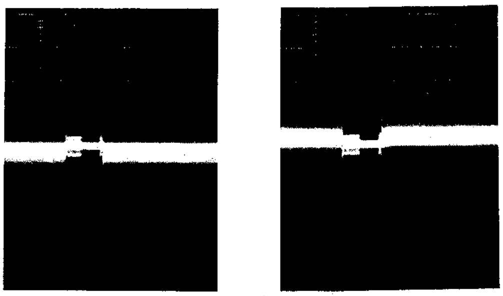
Test points :	TP19(R UP/SHTR FOS)	Process board
	TP20(G UP/SHTR FOS)	Process board
	TP21(B UP/SHTR FOS)	Process board
Adjust :	VR33(R UP/SHTR FOS)	Process board
	VR35(G UP/SHTR FOS)	Process board
	VR37(B UP/SHTR FOS)	Process board

- Turn VR34(R +18dB SHTR FLARE), VR36(G +18dB SHTR FLARE) and VR37(B +18dB SHTR FLARE) fully counter clockwise.
- Connect the oscilloscope to TP19.
- Set the oscilloscope at H rate.
- Adjust VR33 so that a center of the waveform becomes 0V.
- Connect the oscilloscope to TP20.
- Set the oscilloscope at H rate.
- Adjust VR35 so that a center of the waveform becomes 0V.
- Connect the oscilloscope to TP21.
- Set the oscilloscope at H rate.
- Adjust VR37 so that a center of the waveform becomes 0V.

(30) R/G/B Shutter pulse cancel adjustment

Test points :	TP2(R GAIN)	Process board
	TP8(G GAIN)	Process board
	TP14(B GAIN)	Process board
Adjust :	VR22(R SHTR PULSE CANCEL)	Process board
	VR24(G SHTR PULSE CANCEL)	Process board
	VR26(B SHTR PULSE CANCEL)	Process board

- Set the filter wheel to 4(CLOSE) position.
- Set the High Gain Selection Switch to +18dB position.
- Set the Shutter ON/OFF Switch to ON position.
- Connect the oscilloscope to TP2.
- Adjust VR22 so that the pedestal level becomes 0V. (Fig. 4-2-36)



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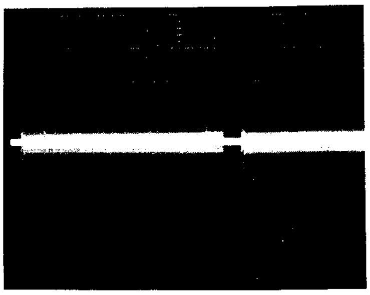


GOOD

Fig. 4-2-36

- Connect the oscilloscope to TP8.
- Adjust VR24 so that the pedestal level becomes 0V. (Fig. 4-2-36)
- Conncet the oscilloscope to TP14.
- Adjust VR26 so that the pedestal level becomes 0V. (Fig.4-2-36)

■ Detail / Shading Board Adjustment

(31) Shading correction adjustment

Test points :	Pin13(R DETAIL)	of Extension board
	Pin17(G DETAIL)	of Extension board
	Pin21(B DETAIL)	of Extension board
Adjust :	(R V SAWTOOTH)	IC19
	(G V SAWTOOTH)	IC19
	(B V SAWTOOTH)	IC19
	(R H SAWTOOTH)	IC19
	(G H SAWTOOTH)	IC19
	(B H SAWTOOTH)	IC19
	(R V TOP)	IC19
	(G V TOP)	IC19
	(B V TOP)	IC19

- Set the filter wheel to 4 (CLOSE) position.
- Set the High Gain Selection Switch to + 18dB position.
- Connect the oscilloscope to pin13 of Extension board.
- Set the oscilloscope at H rate and V rate.

- Adjust VR (R V SAWTOOTH) and VR (R H SAWTOOTH) on IC19 so that the waveform of R signal becomes flat as much as possible at H rate and V rate. (Fig. 4-2-37)

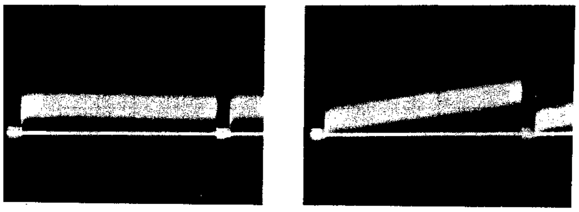

GOOD NO GOOD

Fig. 4-2-37

- Connect the oscilloscope to pin 17 of Extension board.
- Set the oscilloscope at H rate and V rate.
- Adjust VR (G V SAWTOOTH) and VR (G H SAWTOOTH) on IC19 so that the waveform of G signal becomes flat as much as possible at H rate and V rate. (Fig. 4-2-37)
- Connect the oscilloscope to pin 21 of Extension board.
- Set the oscilloscope at H rate and V rate.
- Adjust VR (B V SAWTOOTH) and VR (B H SAWTOOTH) on IC19 so that the waveform of B signal becomes flat as much as possible at H rate and V rate. (Fig. 4-2-37)
- Set the High Gain Selection Switch to + 18dB position.
- Set the Shutter ON/OFF Switch to ON position.
- Set the Shutter Speed Selection Switch to 1/500 position.
- Connect the oscilloscope to pin 13 of Extension board.
- Set the oscilloscope at V rate.
- Adjust VR (R V TOP) on IC19 so that the waveform of R signal becomes flat as much as possible. (Fig. 4-2-38)

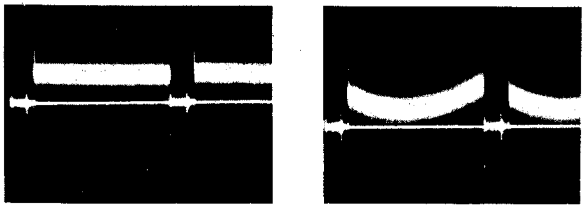

GOOD NO GOOD

Fig. 4-2-38

- Set the High Gain Selection Switch to + 18dB position.
- Set the Shutter ON/OFF Switch to ON position.
- Set the Shutter Speed Selection Switch to 1/500 position.
- Connect the oscilloscope to pin17 of Extension board.
- Set the oscilloscope at V rate.
- Adjust VR (G V TOP) on IC19 so that the waveform of G signal becomes flat as much as possible. (Fig.4-2-38)
- Connect the oscilloscope to pin 21 of extension board.
- Set the oscilloscope at V rate.
- Adjust VR (B V TOP) on IC19 so that the waveform of B signal becomes flat as much as possible. (Fig. 4-2-38)

(32) PLL lock adjustment

Test point :	TP13(PLL LOCK)	Detail / Shading board
Adjust :	CT1(PLL LOCK)	Detail / Shading board

- Connect the oscilloscope to TP13.
- Set the oscilloscope to DC mode.
- Adjust CT1 so that the DC voltage becomes 2.7V ± 0.1V.

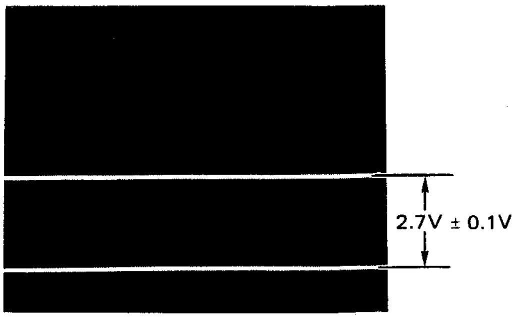


Fig. 4-2-39

(33) 1H sync level adjustment

Test point :	TP2(1H CCD IN)	Detail / Shading board
Adjust :	VR4(1H SYNC LEVEL)	Detail / Shading board

- Set the filter wheel to 1 (3200°K) position.
- Aim the camera at the logarithmic gray scale chart.
- Set the High Band Switch SW5 on the Mother board to HIGH position.
- Set the DTL Level Switch SW6 on the Mother board to High position.
- Set the 1H Pass Switch SW1 on the Detail / Shading board to NOR position.
- Connect the oscilloscope to TP1 (0H).
- Set the oscilloscope at H rate.
- Set the 1H PASS Switch SW1 to NOR position.
- Adjust lens iris so that the G signal level becomes $0.85V_{p\text{-}p}$.

- Connect the oscilloscope to TP2.
- Adjust VR4 so that the sync level becomes 0.1 $V_{P\text{-}P}$.

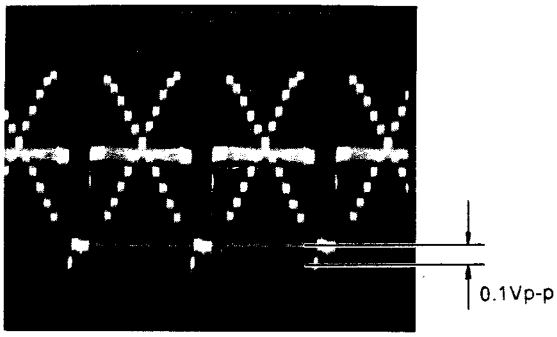


Fig. 4-2-40

(34) 1H CCD V_{GG} adjustment

Test point :	TP3(1H CCD OUT-1)	Detail / Shading board
Adjust :	VR5(1H $V_{GG\text{-}1}$)	Detail / Shading board
	VR6(1H $V_{GG\text{-}2}$)	Detail / Shading board

- Connect the oscilloscope to TP3.
- Set the oscilloscope at H rate.
- Adjust VR5 and VR6 so that the DC level of sync chip becomes 2.7V and the carrier on the gray scale waveform becomes minimum.

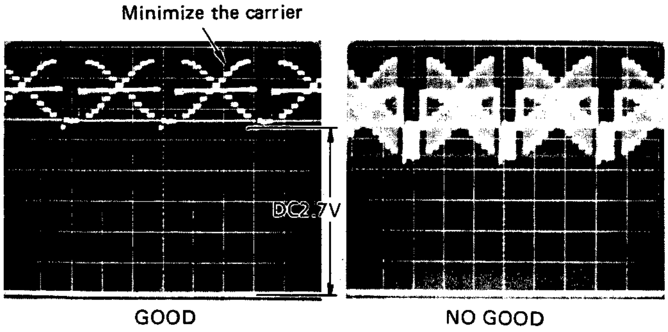


Fig. 4-2-41

(35) 1H CCD dynamic range adjustment

Test point :	TP1(CCD IN)	Detail / Shading board
	TP3(1H CCD OUT-1)	Detail / Shading board
Adjust :	VR3(1H CCD D RANGE)	Detail / Shading board

- Connect the oscilloscope channel 1 to TP1 and channel 2 to TP3.
- Set the oscilloscope at H rate.
- Set the channel 2 of oscilloscope to INV (Invert) and ADD mode.
- Set the GAIN of channel 1 of oscilloscope to CAL and adjust the GAIN of channel 2 so that the level of gray scale on the oscilloscope becomes minimum.

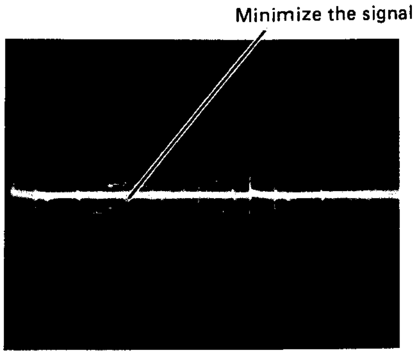


Fig. 4-2-42

(36) 1H output gain adjustment

Test point :	TP4(1H CCD OUT-2)	Detail / Shading board
	TP5(1H OUT)	Detail / Shading board
Adjust :	VR7(1H OUTPUT GAIN-1)	Detail / Shading board
	VR8(1H OUTPUT GAIN-2)	Detail / Shading board
	VR9(1H CLIP LEVEL)	Detail / Shading board

- Connect the oscilloscope to TP5.
- Set the oscilloscope at H rate.
- Adjust VR7 so that the signal level (excluding sync) at TP5 becomes 0.85$V_{P\text{-}P}$.

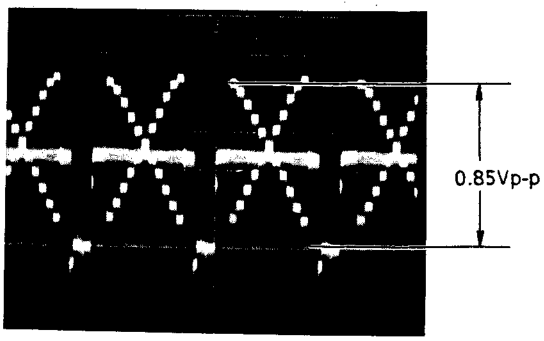


Fig. 4-2-43

- While shortening TP14 (AWC BUSY) and TP15 (GND) of Detail / Shading board, adjust VR8 so that the signal level (excluding sync) at TP5 becomes 0.85 $V_{P\text{-}P}$.
- While observing TP4 and TP5 of Detail board, adjust VR9 so that the sync signal only is clipped at TP5. and confirm that the signal level (excluding sync) at TP5 is 0.85$V_{P\text{-}P}$.

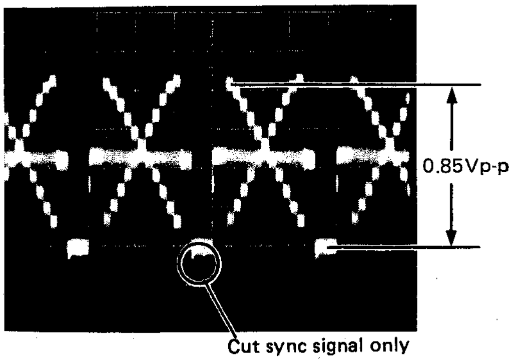


Fig. 4-2-44

(37) 2H CCD V_{GG} adjustment

Test point :	TP7 (2H CCD OUT-1)	Detail/Shading board
Adjusts :	VR11 (2H V_{GG}-1)	Detail/Shading board
	VR12 (2H V_{GG}-2)	Detail/Shading board

- Connect the oscilloscope to TP7.
- Trigger the oscilloscope at H rate using TP7 (HD) on Mother board.
- Adjust VR11 and VR12 so that the DC level of sync chip becomes 2.7V and the carrier on the gray scale waveform becomes minimum.

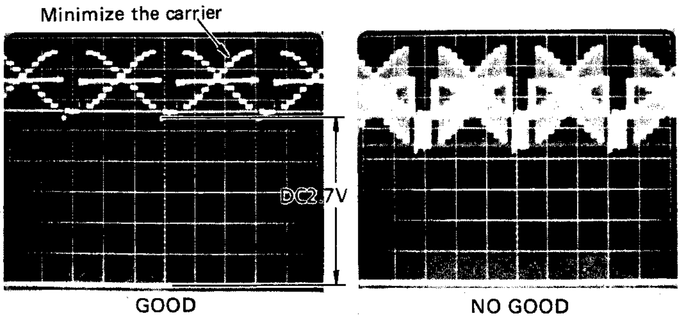


Fig. 4-2-45

(38) 2H CCD dynamic range adjustment

Test point :	TP1 (CCD IN)	Detail/Shading board
Adjusts :	TP7 (2H CCD OUT-1)	Detail/Shading board
	VR10 (2H CCD D RANGE)	Detail/Shading board

- Connect the oscilloscope channel 1 to TP1 and channel 2 to TP7.
- Set the oscilloscope at H rate.
- Set the channel 2 of oscilloscope to INV (Invert) and ADD mode.
- Set the GAIN of channel 1 of oscilloscope to CAL and adjust the GAIN of channel 2 so that the level of gray scale on the oscilloscope minimum.

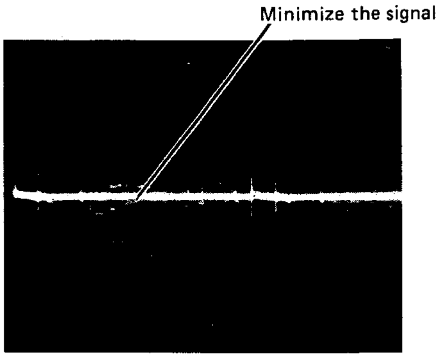


Fig. 4-2-46

While observing the oscilloscope, adjust (rotate) VR10 clockwise as much as possible within the range that waveform level of gray scale is maintained minimum.

(39) 2H output gain adjustment

Test point :	TP8 (2H CCD OUT-2)	Detail/Shading board
	TP9 (2H OUT)	Detail/Shading board
Adjusts :	VR13 (2H OUTPUT GAIN-1)	Detail/Shading board
	VR14 (2H OUTPUT GAIN-2)	Detail/Shading board
	VR15 (2H CLIP LEVEL)	Detail/Shading board

- Connect the oscilloscope to TP9.
- Set the oscilloscope at H rate.
- Adjust VR13 so that the signal level (excluding sync) at TP9 becomes $0.85V_{P\text{-}P}$.

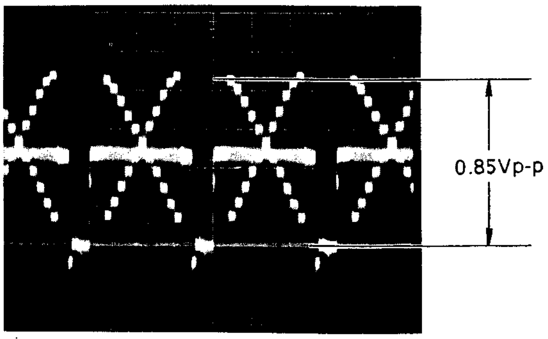


Fig. 4-2-47

- While shortening TP14 (AWC BUSY) and TP15 (GND) of Detail shading , adjust VR14 so that the signal level (excluding sync) at TP9 becomes 0.85V_{P-P}.
- While observing TP8 and TP9 of Detail board, adjust VR15 so that the sync only is clipped at TP9 and confirm that the signal level (excluding sync) at TP9 is 0.85V_{P-P}.

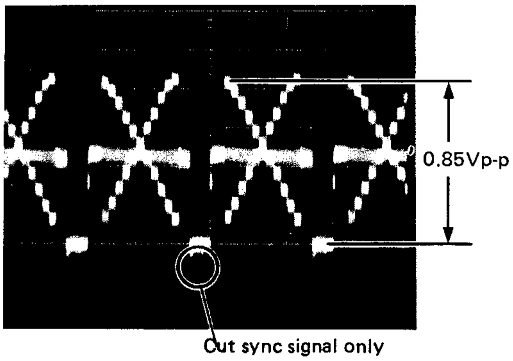
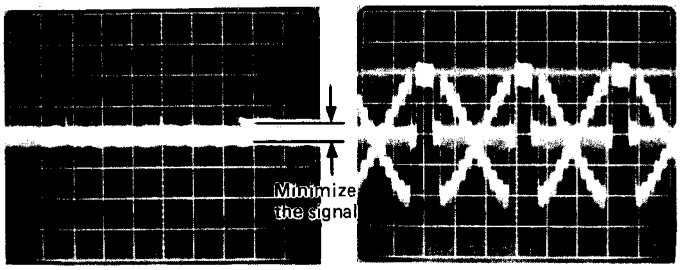


Fig. 4-2-48

(40) V.aperture balance adjustment

Test point :	TP10(V APERTURE OUT)	Detail/Shading board
Adjusts :	VR18 (V APERTURE BAL)	Detail/Shading board

- Connect the oscilloscope to TP10.
- Trigger the oscilloscope at H rate.
- Turn VR19 (V APERTURE GAIN) fully clockwise.
- Adjust VR18 to cancel (minimize) the video signal.



GOOD NO GOOD

Fig. 4-2-49

(41) Noise suppress adjustment

Test point :	TP12 (TOTAL APERTURE OUT)	Detail/Shading board
Adjusts :	VR27 (NOISE SUPPRESS)	Detail/Shading board
	VR26 (GAIN-1 NOISE SUPPRESS)	Detail/Shading board
	VR25 (GAIN-2 NOISE SUPPRESS)	Detail/Shading board

- Set the filter wheel to 4 (CLOSE) position.
- Set the High Gain Selection Switch to 0 dB position.
- Rotate VR28 (total aperture) fully clockwise to have maximum aperture signal.
- Rotate VR23 (LEVEL DEPENDENT) fully counter clockwise to release the level dependent of aperture signal.
- Connect the oscilloscope to TP12.
- Set the oscilloscope at H rate.
- Rotate VR27 fully counterclockwise to release the total noise suppress of aperture signal and note noise level as (A).
- Set the High Gain Selection Switch to + 9 dB position.
- Adjust VR26 that the noise level at TP12 becomes (1/2 x A).

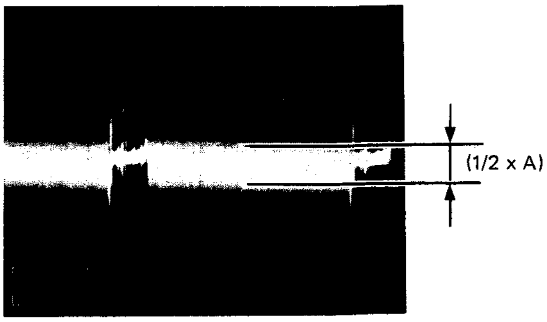


Fig. 4-2-50

- Set the High Gain Selection Switch to + 18 dB position.
- Adjust VR25 so that the noise level at TP12 becomes (1/3 x A).
- Set the High Gain Selection Switch to 0 dB position.

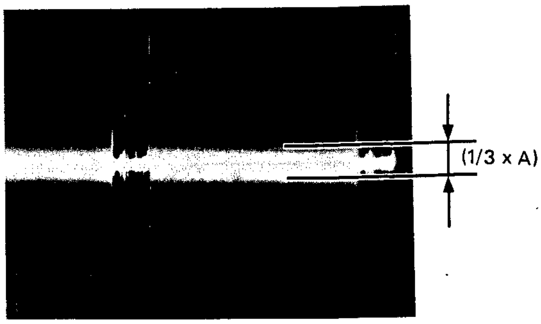


Fig. 4-2-51

■ Auto Board Adjust

(42) Setting of the Calender function.

- Set the Color Bar/ – 6dB/Camera Selection Switch to BAR position.
- Push the DATA INPUT SWITCH SW1 during Pressing the CHECK SWITCH SW3 on the Mother board.
- Confirm that the data of calender is displayed on the video monitor.
- Press the DATA INPUT SWITCH SW1 again.
- Confirm that the data of calender is not displayed on the video monitor.
- Set the Auto White/Auto Black Set Switch to AWC position during pushing the CHECK SWITCH SW3 on the Mother board and get your finger off the SW3.
- Confirm that the data display is below.

```
Day       Month       Year
 1    —     1    —     87
 0    :     0
Hour       Minute
```

Fig.4-2-52

- Set the previous day of the data setting day and the present time using CHECK SWITCH SW3 (Data Shift) and REC TIME RESET SW9 (Data Set).
- The data of the year is memorized until 2100 year in IC15 on the Auto board .
  So paid attention that the set year is 19... or 20...
- Press the CHECK SWITCH SW3 after setting the minute data for usual operation.
- This setting is needed in a short time because of using high current consumption for setting of the calender function.

(43) Charcter Position Adjustment

Test point : VIDEO OUTPUT connector
Adjusts : CT1 (CHARACTER POSITION) Auto board
Observe : Video monitor

- Set the Color Bar/-6dB/Camera Selection Switch to Bar Position.
- Adjust CT1 so that the space between character "D" and "B" is set to colour bar border line between blue and black while pressing the check button on the leftr side of camera. (Fig. 4-2-53)

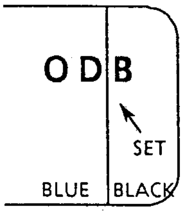


Fig. 4-2-53

(44) Battery warning level adjustment

Test point : Pin11 of CN12(+ 12V) Auto board
Pin1 of CN12(GND) Auto board
Adjusts : VR5 (BATTERY WARNING LEVEL) Auto board
Observe : 1,5" Viewfinder
Digital voltmeter

Use variable voltage DC power supply to this adjustment.

- Set the camera adaptor to the camera head.
- Set the Color Bar/-6dB/Camera Selection Switch to CAM position.
- Set the output voltage of DC power supply to have 10.6V at pin 11 of CN12.
- Set VR5 to fully counterclockwise.
- Turn VR5 until the Battery warning indicator LED in the viewfinder starts flashing.
- After this adjustment completely, set output voltage of DC power supply to have 12.0V.

■ Process Board Adjustment

(45) Frequency adjustment

Test point :	TP16 (R OUT)	Process board
	TP112 (G OUT)	Process board
	TP118 (B OUT)	Process board
Adjusts :	CT1(R FREQ.)	Process board
	CT2(G FREQ.)	Process board
	CT3(B FREQ.)	Process board

- Set the 1H PASS SWITCH SW1 on the Detail/Shading board to NOR position.
- Set the GAMMA ON/OFF SWITCH SW1 on the Process board to off position.
- Set the VR7(R GAIN) and VR20(B GAIN) to mechanical center position.
- Adjust this procedure until the (39) Noise suppress adjustment on the Detail/Shading board.
- Set the filter wheel to 1 (3200°K) position.
- Aim the camera at the in-mega cycle chart.
- Connect the oscilloscope to TP6.
- Set the oscilloscope at H rate.
- Adjust CT1 so that the waveform from 0.5MHz to 6MHz becomes flat as much as possible.

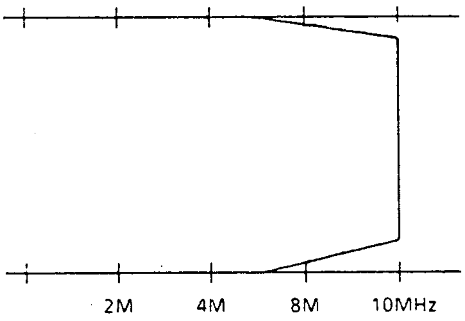


Fig. 4-2-55

- Connect the oscilloscope to TP12.
- Adjust CT2 so that the waveform from 0.5MHz to 6MHz becomes flat as much as possible.
- Connect the oscilloscope to TP18.
- Adjust CT3 so that the waveform from 0.5MHz to 6MHz becomes flat as much as possible.

(46) Camera pedestal adjustment

Test point :	VIDEO OUT connector	
Adjusts :	VR18 (CAMERA PEDESTAL)	Sync/Encoder board
Observe :	Waveform monitor	

- Set the High Gain Selection Switch to 0dB position.
- Set the Shutter ON/OFF Switch to 0dB
- Set the Color Bar/Camera Selection Switch to Camera position.
- Turn VR 1 (TOTAL PEDESTAL) on the Mother board fully counterclockwise.
- Adjust VR so that pedestal level becomes 0 V.
- Set VR1 to its mechanical center.

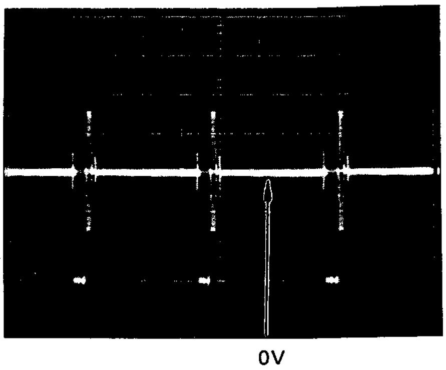


Fig. 4-2-56

(47) R/G/B pedestal, pulse cancel fine-adjustment

Test point :	TP12 (G OUT)	Process board
	VIDEO OUTPUT Connector	
Adjusts :	VR27(R PEDESTAL LEVEL)	Process board
	VR28(G PEDESTAL LEVEL)	Process board
	VR29(B PEDESTAL LEVEL)	Process board
	VR21(R PULSE CANCEL)	Process board
	VR23(G PULSE CANCEL)	Process board
	VR25(B PULSE CANCEL)	Process board

- Set the filter wheel to 4(CLOSE) position.
- Set VR4(R GAMMA), VR11(G GAMMA) and VR17(B GAMMA) to mechanical center.
- Set the Gamma ON/OFF Switch on the Process board to ON position.
- Connect the oscilloscope to TP12(G OUT).
- Adjust VR28(G PEDESTAL LEVEL) so that the pedestal level becomes 35mV.

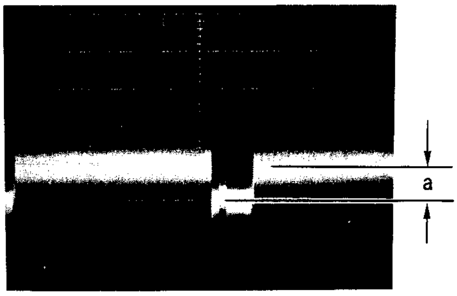


Fig. 4-2-57

- Adjust VR23 so that the pedestal level a is not changed when the High Gain Selection Switch is set to +18dB position. Repeat this adjustment a few times.
- Adjust VR27 (R PEDESTAL LEVEL), VR29 (B PEDESTAL LEVEL), VR21 (R PULSE CANCEL) and VR25 (B PULSE CANCEL) so that the vector positions at the center of the vectorscope.

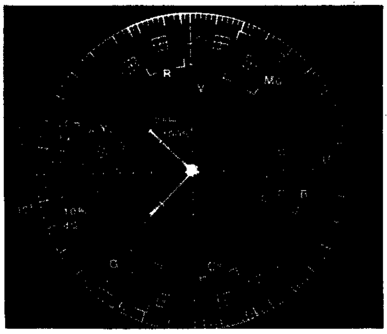


Fig. 4-2-58

(48) R/G/B Shutter, pulse cancel fine-adjustment

Test point :	TP12 (G OUT)	Process board
	VIDEO OUTPUT Connector	
Adjusts :	VR22(R SHUT PULSE CANCEL)	Process board
	VR24(G SHUT PULSE CANCEL)	Process board
	VR26(B SHUT PULSE CANCEL)	Process board

- Set the filter wheel to 4(CLOSE) POSITION.
- Set VR30(R GAMMA), VR31(G GAMMA) and VR32(B GAMMA) to mechanical center.
- Set the Gamma ON/OFF Switch on the process board to ON position.
- Connect the oscilloscope to TP12(G OUT).
- Adjust VR24 so that the pedestal level is not changed when the High Gain Selection Switch set to +18dB position, Shutter ON/OFF Switch to ON(1/500) position.(Fig. 4-2-57)
- Adjust VR22(R SHTR PULSE CANCEL) and VR26(B SHTR PULSE CANCEL) so that the vector positions at the center of the vectorscope.

(49) Black and White total adjustment

Test points :	TP12(G OUT)	Process board
	VIDEO OUTPUT Connector	
Adjust :	VR1(R INPUT GAIN)	Process board
	VR8(G INPUT GAIN)	Process board
	VR14(B INPUT GAIN)	Process board
	VR30(R GAMMA)	Process board
	VR31(G GAMMA)	Process board
	VR32(B GAMMA)	Process board
	VR27(R PEDESTAL LEVEL)	Process board
	VR28(G PEDESTAL LEVEL)	Process board
	VR29(B PEDESTAL LEVEL)	Process board
Observe :	Vectorscope	
	Waveform monitor	

Position of Controls and Switches
(Detail/Shading board)
- SW1(1H PASS SWITCH) .... NOR

(Mother board)
- SW6(DTL LEVEL SWITCH .... LOW
- SW1(SHUTTER ON/OFF SWITCH) .... OFF
- VR1(TOTAL PEDESTAL) .... CENTER
- VR2(R GAIN) .... CENTER
- VR3(B GAIN) .... CENTER

(Left side of camera) Viewed from rear
- High Gain Selection Switch .... 0 dB
- White Balance Selection Switch .... MAN
- Colour Bar /-6dB/ Camera Selection Switch .. CAM
- Set the lens iris reffering to (25) lens iris setting.
- Connect the oscilloscope to TP12.
- Confirm that the level of the waveform is 700mV.
- Open the lens iris so that the video signal level of VIDEO OUTPUT connector becomes 700mV.
- Adjust VR30(R GAMMA), VR31(G GAMMA) and VR32(B GAMMA) so that the gamma cross point level becomes 0.40V ± 0.007V. (Fig. 4-2-59)

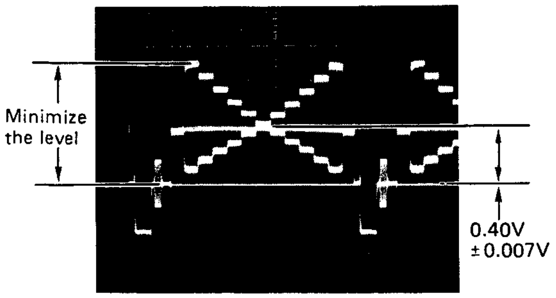


Fig. 4-2-59

- Adjust VR27(R PEDESTAL LEVEL), VR28(G PEDESTAL LEVEL) and VR29(B PEDESTAL LEVEL) so that the pedestal level becomes 0.035V ± 0.01V. (Fig. 4-2-60).

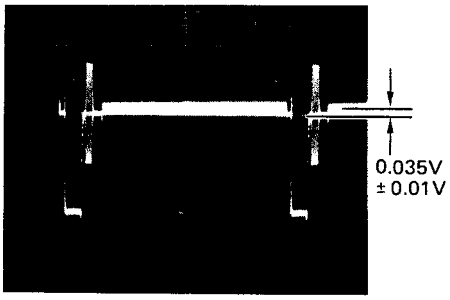


Fig. 4-2-60

(50) R/G/B White clip adjustment

Test points :	VIDEO OUTPUT Connector	
Adjust :	VR4(R WHITE CLIP)	Process board
	VR11(G WHITE CLIP)	Process board
	VR17(B WHITE CLIP)	Process board
Observe :	Waveform monitor Vectorscope	

- Set the filter wheel to 1 (3200°K) position.
- Set the High Gain Selection Switch to 0dB position.
- Set the Colour Bar/-6dB/Camera Selection Switch to -6dB position.
- Set the vectorscope to the maximum gain.
- Aim the camera at the logarithmic gray scale chart and set the lens iris to fully open.
- Repeat adjusting VR4 VR11 and VR17 so that the clip level of gray scale signal becomes 0.77V ± 0.014V, the carrier on the clip level of gray scale signal becomes minimum and the vector positions at the center of the vectorscope. (Fig. 4-2-61, Fig. 4-2-62)

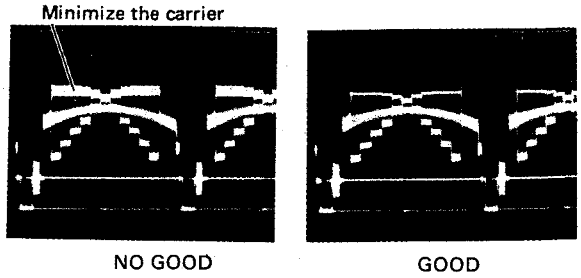


Fig. 4-2-61

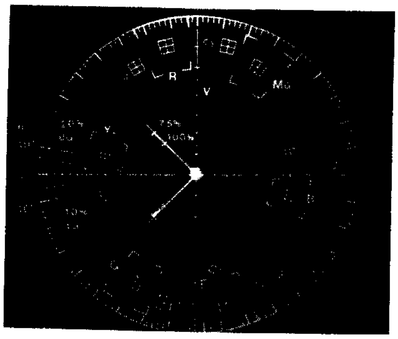


Fig. 4-2-62

(51) Flare adjustment

Adjusts :	VR2(R FLARE GAIN)	Process board
	VR9(G FLARE GAIN)	Process board
	VR15(B FLARE GAIN)	Process board
Observe :	Waveform monitor	

- Set the High Gain Selection Switch to 0dB position.
- Set Shutter ON/OFF Switch to OFF position.
- Aim the camera at the gray scale chart and adjust lens iris so that the white level becomes 100IRE and note the F. STOP of lens iris as (A).
- Open 2 F.STOP of lens iris from (A).
- Confirm that the VR9 is set to fully counterclockwise.
- Adjust VR2 and VR15 so that the carrier leak on the lowest step of gray scale becomes minimum. If not, fine-adjust the VR9 to clockwise just a little and adjust VR2 and VR15 so that the carrier leak on the lowest step of gray scale becomes minimum.
- When using a gray scale chart with super black (reflection rate :89%), set the super black level to 0.175V ± 0.014V.

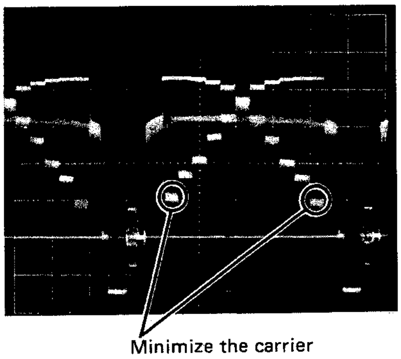
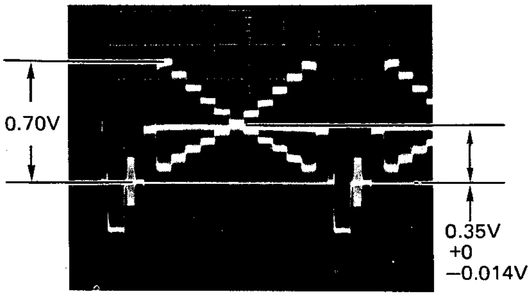


Fig. 4-2-63

(52) R/G/B + 18dB Gamma adjustment

Test points : VIDEO OUTPUT Connector
Adjusts : VR5(R + 18dB GAMMA) Process board
VR12(G + 18dB GAMMA) Process board
VR18(B + 18dB GAMMA) Process board
Observe : Waveform monitor

- Set the High Gain Selection Switch to + 18dB position.
- Aim the camera at the gray scale chart and adjust lens iris so that the white level becomes 0.7V.
- Adjust VR5(R + 18dB GAMMA) so that the gamma cross point becomes 0.35V + 0 -0.014V. (Fig. 4-2-64)



- Adjust VR12(G + 18dB GAMMA) so that the gamma cross point becomes 0.35V + 0 -0.014V. (Fig. 4-2-64)
- Adjust VR18(B + 18dB GAMMA) so that the gamma cross point becomes 0.35V + 0 -0.014V. (Fig. 4-2-64)

(53) R/G/B + 18dB shutter gamma adjustment

Test points : VIDEO OUTPUT Connector
Adjusts : VR6(R + 18dB SHTR GAMMA)
Process board
VR13(G + 18dB SHTR GAMMA)
Process board
VR19(B + 18dB SHTR GAMMA)
Process board
Observe : Waveform monitor

- Set the High Gain Selection Switch to + 18dB position.
- Set the Shutter ON/OFF Switch to ON position.
- Set the Shutter Speed Selection Switch to 1/500 position.
- Adjust VR6(R + 18dB SHTR GAMMA) so that the gamma cross point becomes 50IRE. (Fig. 4-2-64)
- Adjust VR13(G + 18dB SHTR GAMMA) so that the gamma cross point becomes 50IRE. (Fig. 4-2-64)
- Adjust VR19(B + 18dB SHTR GAMMA) so that the gamma cross point becomes 50IRE. (Fig. 4-2-64)

(54) + 18dB shutter flare ADJUSTMENT

Test points : VIDEO OUTPUT Connector
Adjusts : VR34(R + 18dB SHTR FLARE)
Process board
VR36(G + 18dB SHTR FLARE)
Process board
VR38(B + 18dB SHTR FLARE)
Process board
Observe : Waveform monitor

- Set the High Gain Selection Switch to + 18dB position.
- Set the Shutter ON/OFF Switch to ON position.
- Set the Shutter Speed Selection Switch to 1/500 position.
- Adjust VR34(R + 18dB SHTR FLARE) and VR38(B + 18dB SHTR FLARE) so that the carrier leak on the lowest step of gray scale becomes minimum. if not, fine-adjust VR36(G + 18dB SHTR FLARE) to clockwise just a little and adjust VR34 and VR38 so that the carrier leak on the lowest step of gray scale becomes minimum.

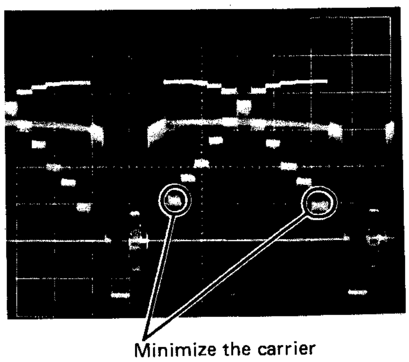


Fig. 4-2-65

(55) R/G/B knee point and knee slope adjustment

Test points :	VIDEO OUTPUT Connector	
Adjust :	VR1(R KNEE POINT)	on the HIC2
	VR1(G KNEE POINT)	on the HIC4
	VR1(B KNEE POINT)	on the HIC6
	VR3(R KNEE SLOPE)	on the HIC2
	VR3(G KNEE SLOPE)	on the HIC4
	VR3(B KNEE SLOPE)	on the HIC6
Observe :	Waveform monitor	

- Set KNEE ADJ SW3 on the Process board to ON position.
- Turn VR3(R KNEE SLOPE), VR3(G KNEE SLOPE) and VR3(B KNEE SLOPE) fully clockwise.
- Set VR2(R REF VOLTAGE), VR2(G REF VOLTAGE) and VR2(B REF VOLTAGE) to mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Adjust the lens iris so that the VIDEO OUTPUT level becomes 700mV and note the F stop of lens iris as (B).
- Open the lens iris 2F-STOP from (B).
- Adjust VR1(R KNEE POINT), VR1(G KNEE POINT) and VR1(B KNEE POINT) so that the starting point of the knee effect is 700mV in Fig. 4-2-66 and minimize the carrier of portion where knee point.

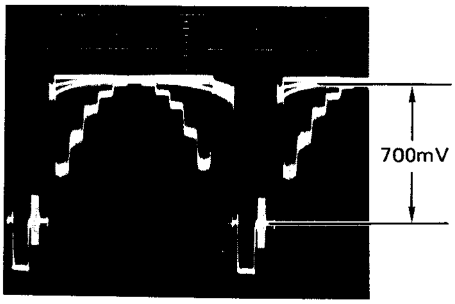


Fig. 4-2-66

- Turn VR3 on the HIC2, HIC4 and HIC6 to counterclockwise respectively so that the top and 2nd step of the gray scale waveform can be distinguished by adjustment each VR3. At this time the top of the gray scale waveform should not less than 770mV, And minimize the carrier of the knee portion. (Fig. 4-2-67)

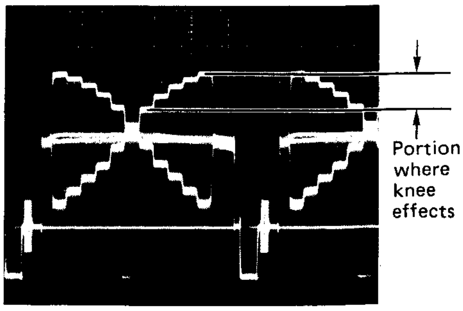


Fig. 4-2-67

(56) Reference voltage adjustment

Test point :	VIDEO OUTPUT Connector	
Adjust :	VR2(R REF VOLTAGE)	on the HIC2
	VR2(B REF VOLTAGE)	on the HIC6
Observe :	Waveform monitor	

- Set the KNEE ADJ SW3 on the Process board to OFF position.
- Adjust VR2(R REF VOLTAGE) and VR3(B REF VOLTAGE) so that the carrier on the waveform becomes minimum. Then don't turn VR2(G REF VOLTAGE) on the HIC4.
- Confirm that the carrier on the waveform is the same level while turning SW3 on and off.

(57) Matrix adjustment

Test points :	VIDEO OUTPUT Connector	
Adjusts :	VR39(R-Y MATRIX)	Process board
	VR40(B-Y MATRIX)	Process board
Observe :	Vectorscope	

- Connect the oscilloscope to VIDEO OUTPUT connector.
- Set the oscilloscope at H rate.
- Aim the camera at color chart.
- Set Matrix ON/OFF switch SW2 on the Process board to ON position.
- Set the MATRIX ON/OFF Switch SW11 to ON position that is turned fully clockwise.
- Adjust lens iris so that white chip level of color chart on the oscilloscope becomes 560mV.

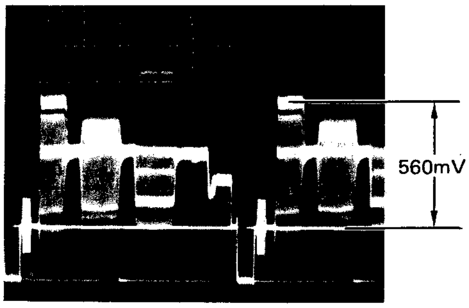


Fig. 4-2-68

- Adjust VR39(R-Y MATRIX) so that Red vector becomes 104° on the vectorscope.
- Adjust VR40(B-Y MATRIX) so that YL vector becomes 157° on the vectorscope.

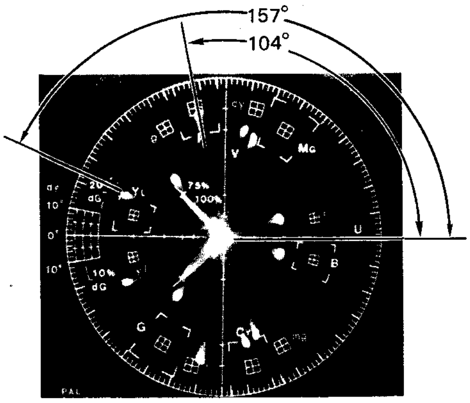


Fig. 4-2-69

(58) R/B Phase adjustment

Test points : VIDEO OUTPUT Connector
Adjusts : VR7(R GAIN) Process board
VR20(B GAIN) Process board
Observe : Video monitor

- Aim the Camera at the resolution chart.
- Adjust lens focus for best resolution on the monochrome underscanned video monitor.
- Adjust lens iris so that the white level becomes 490mV - 560mV.
- Adjust VR7 and VR20 for best resolution on the monochrome underscanned video monitor.

■ Detail/Shading Board Adjustment

(59) V and H aperture adjustment

Test points : VIDEO OUTPUT Connector
Adjust : VR19 (V APERTURE) Detail/Shading Board.
VR20 (H APERTURE HIGH) Detail/Shading Board.
VR30 (H APERTURE LOW) Detail/Shading Board.

- Set the Band Selection Switch (SW5) and the Detail Switch (SW6) on the Mother board to high position.
- Set the VR28 TOTAL APERTURE) to mechanical center position.
- Aim the camera at the window chart and adjust lens iris so that the white level becomes 490mV.
- Adjust the gain of the waveform monitor so that the black-white level becomes 100%.
- Adjust VR20 so that H aperture high level becomes 120%.
- Set the Band Selection Switch (SW5) on the Mother board to Low position.
- Adjust VR30 so that H aperture low level becomes 125%.

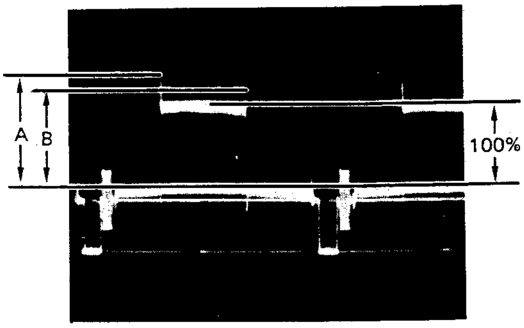


Fig. 4-2-70

- Note : Turn VR28 to clockwise when it can not adjust the aperture level because of a little level (A-B) in Fig.4-2-70.

(60) Level dependent adjustment
Test point : VIDEO OUTPUT Connector
Adjust : VR23 (LEVEL DEPENDENT) Detail/Shading Board.
VR24 (GAIN-2 LEVEL DEPENDENT) Detail/Shading Board.

- Adjust VR23 so that the aperture signal on the lowest step of gray scale signal is suppressed.

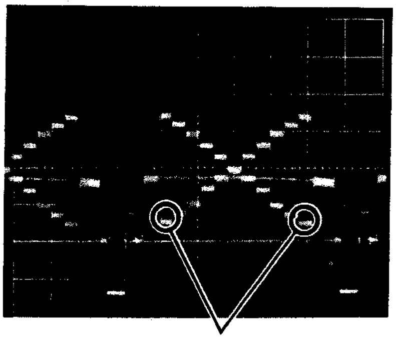


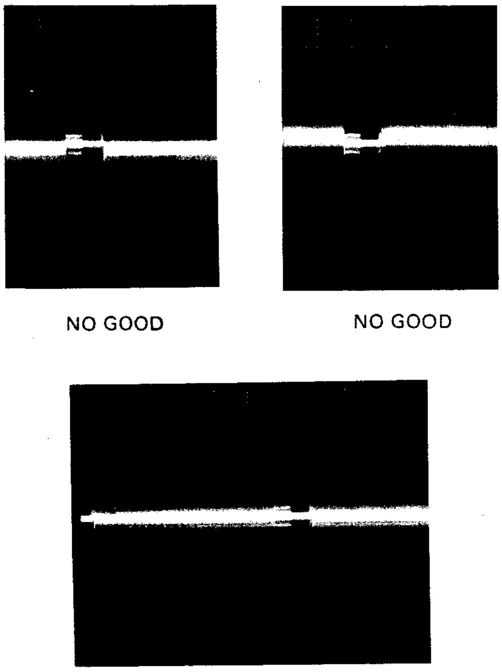
Fig.4-2-71

- Rotate VR24 fully counterclockwise.

(61) 2H Sync clip fine-adjustment

Test point : TP12 (TOTAL APERTURE OUT) Detail/Shading Board.
Adjust : VR15 (2H CLIP LEVEL) Detail/Shading Board.

- Set the filter wheel to 4 (CLOSE) position.
- Connect the oscilloscope to TP12.
- Adjust VR15 so that the pedestal level becomes 0V. (Fig.4-2-72)



NO GOOD NO GOOD

GOOD

FIG.4-2-72

- Aim the camera at the logarithmic gray scale chart (VIDEO OUT 700mV) and confirm not to change the black level when the Detail Switch is switched on and off.
- Note : Be careful of adjustment that the waveform is bounced by the Detail Switch on and off.

(62) V-aperture balance fine adjustment

Test points : VIDEO OUTPUT Connector
Adjusts : VR18 (V.APERTURE BAL) Detail/shading Board

- Aim the camera at the logarithmic gray scale chart and adjust the VR18 so that the level difference of video signal becomes minimum when the DTL Level Switch SW6 on the Mother board is set to LOW or OFF.

Sync/Encoder Board Adjustment

(63) Level indicator adjustment

Test points : VIDEO OUTPUT Connector
Adjusts : VR26 (ZEBRA LEVEL) Sync/Encoder board

Observe : Viewfinder
Waveform monitor

- Set the filter wheel to 1 (3200°K) position.
- Set the High Gain Selection Switch to 0dB position.
- Aim the camera at the logarithmic gray scale chart.
- Confirm that level indicator ON/OFF Switch on the Mother board is set to ON position.
- Set the lens iris so that the white level becomes 95IRE-100IRE
- Adjust VR26 so that the white chip (top step) of the logarithmic gray scale turns into ZEBRA pattern on the view finder.

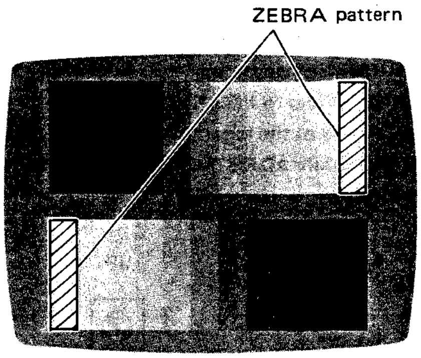
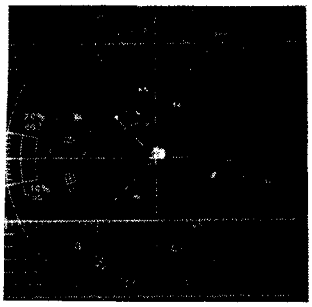


fig.4-2-73

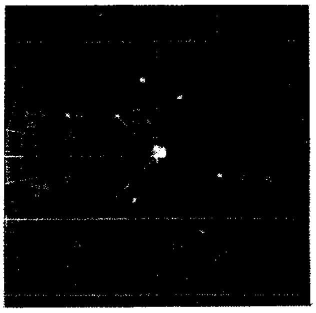
(64) Subcarrier phase fine adjustment

Test points : VIDEO OUTPUT Connector
Adjust : VR30 (SC PHASE)
Detail/shading Board

- Aim the camera at the colour chip chart.
- Adjust lens iris so that white chip level of colour chart on the vectorscope becomes 90% level.
- Set the vectorscope to NTSC mode.
- Adjust VR30 (SC PHASE) so that two dots of each colour chip are fit in one dot on the vectorscope . (Fig.4-2-74)



NO GOOD



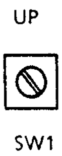
GOOD

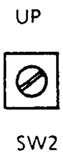
(65) Auto lens control adjustment (Power/ALC board)

Test point : VIDEO OUTPUT connector
Adjusts : VR403 (ALC GAIN) Power/ALC board
VR6 (IRIS LEVEL) Mother board
SW1 (ALC GAIN ADJUSTMENT)
Power/ALC board
SW2 (ALC GAIN ADJUSTMENT)
Power/ALC board

Lighting " 2000lux, incident,3200K.

- Set the Iris Control Selection Switch of the servo zoom lens to M (Manual) position.
- Set the filter wheel to 1 (3200K) position.
  Aim the camera at the logarithmic gray scale chart.
- Set the ALC GAIN ADJUSTMENT Switch SW1 and SW2 to below position.





- Set the Lens Iris Selection Switch to NOR position.
- Set the High Gain Selection Switch to 0 dB position.
- Set the White Balance Selection Switch to MANUAL position.
- Adjust VR6 (IRIS LEVEL) on the Mother board so that the waveform level becomes 100 ire while pressing the Auto White/Auto Black Set Switch to AWC position.
- Set the high gain selection switch to + 18dB position.
- Adjust VR6 (IRIS LEVEL) on the Mother board so that the waveform level becomes 100 IRE while pressing the Auto White/Auto Black Set Switch to AWC position.
- Repeat this procedure so that the waveform level becomes 100 IRE when the High Gain Selection Switch is set to 0dB and + 18dB position.
- Confirm that the Lens Iris Selection Switch is set to 1/2 OPEN position.
- Confirm that the lens iris close 1/2 F stop when the Lens Iris Selection Switch is set to 1/2 CLOSE position.

(66) Anticlose adjustment

Observe : Video monitor
Adjust : VR404(ANTI CLOSE) Power/ALC board

- Set the iris Control Selection Switch to A (Auto) position.
- Aim the camera at the halogen lamp.
- Adjust VR404(ANTI CLOSE) so that the lens iris becomes F16.
- Cap on the lens.
- Confirm that the lens iris becomes F16 when the cap is taken off the lens.
  If not, adjust VR404 again.

(67) Auto black control adjustment (Auto board)

Test points : VIDEO OUTPUT Connector
Adjust : VR3(AUTO BLACK CONTROL-1) Auto board
VR4(AUTO BLACK CONTROL-2) Auto board

- Set the Colour Bar /-6dB/ Camera Selection Switch to the CAMERA position.
- Set the White Balance Selection Switch to AWC A position.
- Aim the camera at the logarithmic gray scale chart. (Lighting : 2000lux, 3200°K)

<1> Set the High Gain Selection Switch to 0 dB position.
<2> Set the Shutter ON/OFF Switch to OFF position.
<3> Adjust lens iris so that the signal level becomes 90%
<4> Press up the Auto White/Auto Black Set Switch to AWC position.
<5> Close lens iris or cap on the lens.
<6> Press down the Auto White/Auto Black Set Switch to ABC position while pressing Data Input switch (SW1) on Auto board.

<7> Adjust VR3 (AUTO BLACK CONTROL-1) and VR4 (AUTO BLACK CONTROL-2) on Auto board so that vector positions at the center of vectorscope and then press Data Input switch (SW1) again.

<8> Press down the Auto White/Auto Black Set Switch to ABC position while pressing Check Button.

※ This is for fine adjusting pedestal levels in shutter mode and for memorizing.

<9> Press down the Auto White/Auto Black Set Switch to ABC position while pressing Rec Time Switch (SW9) on Mother board.

※ This is for fine adjustment of ABC.

<10> Set Shutter ON/OFF Switch to ON position. and Shutter speed Selection Switch to 1/500 position.

<11> Repeat procedure <9> again.

<12> Set the Shutter ON/OFF Switch to OFF position.

<13> Press down the Auto White/Auto Black Set Switch to ABC position and confirm that vector is kept at the center on vectorscope.

If it is not center, repeat step (6) to (11) until vector is maintained center on the vectorscope.

(68) Auto white control adjustment (Auto board)

Test point :	VIDEO OUTPUT Connector	
Adjust :	VR1(ITEM SELECT)	Auto board
	VR2(DATA SELECT)	Auto board

- Set the Colour Bar /-6dB/ Camera Selection Switch to the CAMERA position.
- Set the White Balance Selection Switch to AWC A position.(Don't preset)
- Aim the camera at the logarithmic gray scale chart. (Lighting : 2000lux, 3200°K)

<1> Set the High Gain Selection Switch to 0 dB position.

<2> Set the Shutter ON/OFF Switch to OFF position.

<3> Adjust lens iris so that the signal level becomes 90%

<4> Press up the Auto White/Auto Black Set Switch to AWC position while pressing Data Input switch (SW1) on Auto board.

<5> Adjust VR1 (ITEM SELECT) and VR2 (DATA SELECT) so that vector positions at the center of vectorscope and then press Data Input switch (SW1) again.

<6> Set the Shutter ON/OFF Switch, Shutter Speed Selection Switch and High Gain Selection Switch to following positions.

And press up the Auto White Auto Black Set Switch to AWC position while pressing Rec Time Reset Switch (SW9) on Mother board in each mode.

※ This is adjusting white balance to best position in each mode and for memorizing.

	SHUTTER	HIGH GAIN
1	OFF	+9dB
2	OFF	+18dB
3	1/250	0dB
4	1/250	+9dB
5	1/250	+18dB
6	1/500	0dB
7	1/500	+1dB
8	1/500	+18dB
9	1/2000	+0dB
10	1/2000	+9dB
11	1/2000	+18dB

4-3 Camera Adaptor Adjustment

- The camera must be completely aligned before Camera Adaptor adjustment is made.
- Disassemble the Camera Adaptor while referring to 2-3 Camera Adaptor on page 1.
- Refer to the separate booklet for the Test Points and Adjusting Controls.
- Connect the Camera Adaptor to the camera head.
- Connect the camera and the remote control unit (RCU) using 32 pin camera cable 32A-25.

Position of Controls and Switches on the Camera

<Left Side> Viewed from rear

Filter Wheel	1
High Gain Selection Switch	0 dB
Color Bar/Camera Selection Switch	BAR
White Balance Selection Switch	MANUAL
Power Switch	ON

<Mother board>

T PED	Center
R GAIN	Center
B GAIN	Center
Detail Level Selection Switch	ON
Shutter ON/OFF Switch	OFF
H PHASE	Center
SC PHASE	Center
Lens Iris Control	Center
Level Indicator ON/OFF Switch	ON
-6dB ON/OFF Switch	OFF

<Front>

Auto White/Auto Black Set Switch	HOLD
Lens Iris Selection Switch	NOR

<Right Side> Viewed from rear

Power Selector Switch	VTR/RCU
VTR Compatibility Switch	⊕1
Audio Monitor/Intercom Level Control	Center
Audio Level Selection Switch	-20
VTR video Output Selection Switch	ENC
Audio Monitor Selection Switch	INT

<Lens>

Iris Control Selection Switch	A (Auto)
Servo/Manual Zoom Selection Switch	MANUAL

Position of Controls and Switches on the RCU

Power Switch	ON
High Gain Selection Switch	0 dB
Auto White/Auto Black Set Switch	HOLD
White/Black Balance Selection Switch	MANUAL
R GAIN	Center
B GAIN	Center
Detail ON/OFF Switch	OFF
Cable Length Compensation Switch	50m (150ft)
Intercom Level Control	Center
Color Bar/Camera Selection Switch	BAR
H PHASE	Center
SC PHASE FINE	Center
SC Phase Coarse Switch	0°
TOTAL PEDESTAL	Center
R PEDESTAL	Center
B PEDESTAL	Center
Y ADJUST	Center
CHROMA ADJUST	Center
Lens Iris Control	AUTO

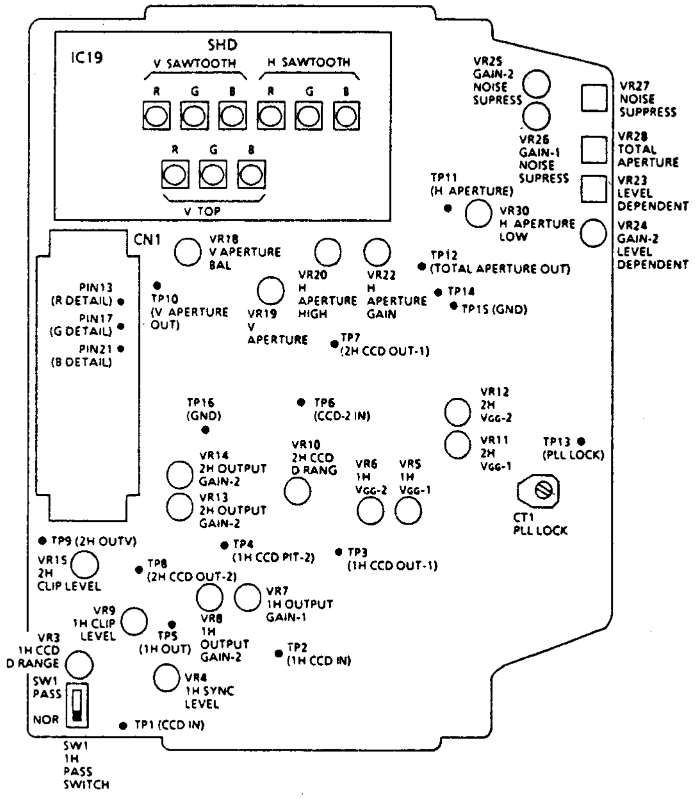
(1) +9V adjustment

Test point :	**TP1 (+9V)**
Adjust :	**VR1 (+9V ADJ)**

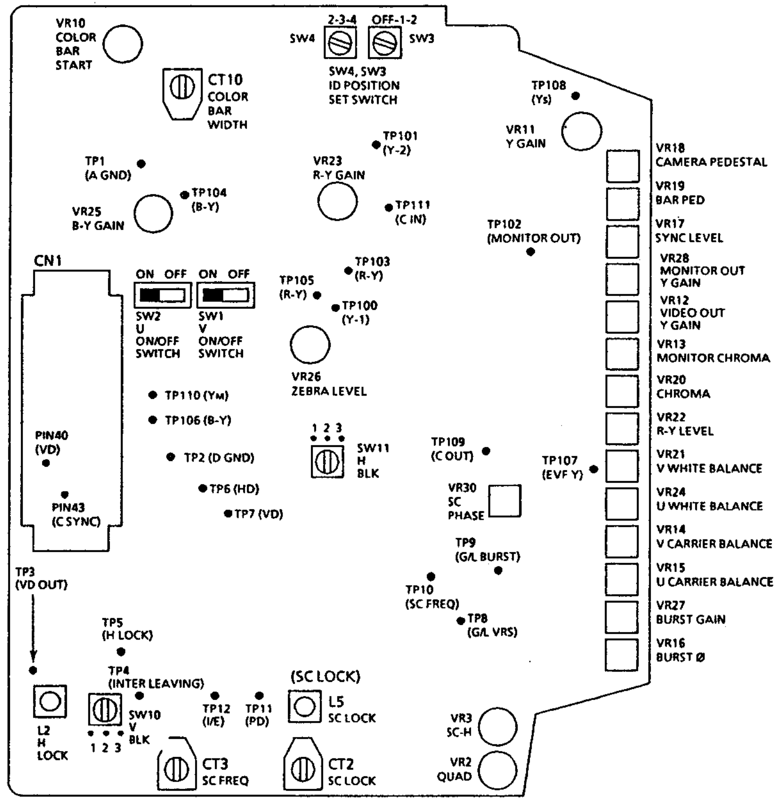
- Connect the digital voltmeter to TP1.
- Adjust VR1 for 9V ± 0.05V.

5. LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

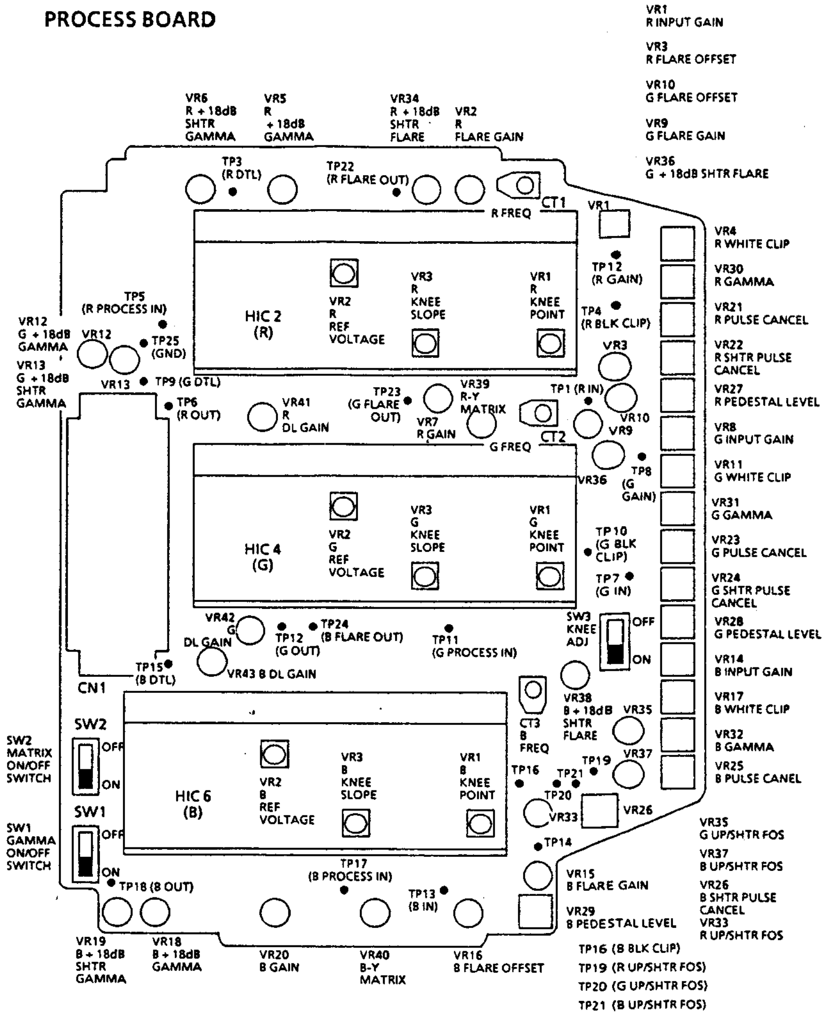
DETAIL/SHADING BOARD


IC19
SHD
V SAWTOOTH
H SAWTOOTH
R G B R G B
R G B
V TOP
VR25 GAIN-2 NOISE SUPRESS
VR26 GAIN-1 NOISE SUPRESS
VR27 NOISE SUPPRESS
VR28 TOTAL APERTURE
VR23 LEVEL DEPENDENT
VR24 GAIN-2 LEVEL DEPENDENT
TP11 (H APERTURE)
VR30 H APERTURE LOW
CN1
VR18 V APERTURE BAL
VR20 H APERTURE HIGH
VR22 H APERTURE GAIN
TP12 (TOTAL APERTURE OUT)
TP14
TP15 (GND)
PIN13 (R DETAIL)
PIN17 (G DETAIL)
PIN21 (B DETAIL)
TP10 (V APERTURE OUT)
VR19 V APERTURE
TP7 (2H CCD OUT-1)
TP16 (GND)
TP6 (CCD-2 IN)
VR12 2H VGG-2
VR11 2H VGG-1
TP13 (PLL LOCK)
VR14 2H OUTPUT GAIN-2
VR13 2H OUTPUT GAIN-2
VR10 2H CCD D RANG
VR6 1H VGG-2
VR5 1H VGG-1
CT1 PLL LOCK
TP9 (2H OUTV)
VR15 2H CLIP LEVEL
TP8 (2H CCD OUT-2)
TP4 (1H CCD PIT-2)
TP3 (1H CCD OUT-1)
VR7 1H OUTPUT GAIN-1
VR9 1H CLIP LEVEL
VR8 1H OUTPUT GAIN-2
TP5 (1H OUT)
TP2 (1H CCD IN)
VR3 1H CCD D RANGE
SW1 PASS
NOR
VR4 1H SYNC LEVEL
TP1 (CCD IN)
SW1 1H PASS SWITCH

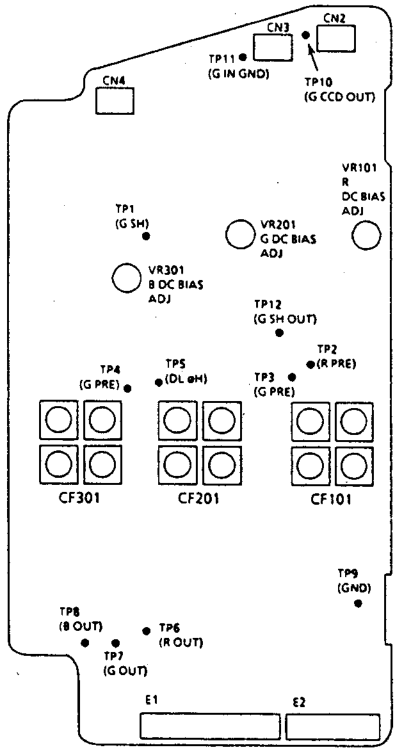
SYNC/ENCODER BOARD


VR10 COLOR BAR START
CT10 COLOR BAR WIDTH
SW4
2-3-4
OFF-1-2
SW3
SW4, SW3 ID POSITION SET SWITCH
TP108 (Ys)
VR11 Y GAIN
TP1 (A GND)
TP104 (B-Y)
VR25 B-Y GAIN
VR23 R-Y GAIN
TP101 (Y-2)
TP111 (C IN)
TP102 (MONITOR OUT)
VR18 CAMERA PEDESTAL
VR19 BAR PED
VR17 SYNC LEVEL
VR28 MONITOR OUT Y GAIN
VR12 VIDEO OUT Y GAIN
VR13 MONITOR CHROMA
VR20 CHROMA
VR22 R-Y LEVEL
VR21 V WHITE BALANCE
VR24 U WHITE BALANCE
VR14 V CARRIER BALANCE
VR15 U CARRIER BALANCE
VR27 BURST GAIN
VR16 BURST Ø
CN1
ON OFF ON OFF
SW2 U ON/OFF SWITCH
SW1 V ON/OFF SWITCH
TP105 (R-Y)
TP103 (R-Y)
TP100 (Y-1)
VR26 ZEBRA LEVEL
TP110 (YM)
TP106 (B-Y)
TP2 (D GND)
TP6 (HD)
TP7 (VD)
PIN40 (VD)
PIN43 (C SYNC)
1 2 3
SW11 H BLK
TP109 (C OUT)
TP107 (EVF Y)
VR30 SC PHASE
TP9 (G/L BURST)
TP10 (SC FREQ)
TP8 (G/L VRS)
TP3 (VD OUT)
TP5 (H LOCK)
TP4 (INTER LEAVING)
L2 H LOCK
SW10 V BLK
1 2 3
TP12 (I/E)
TP11 (PD)
(SC LOCK)
L5 SC LOCK
CT3 SC FREQ
CT2 SC LOCK
VR3 SC-H
VR2 QUAD

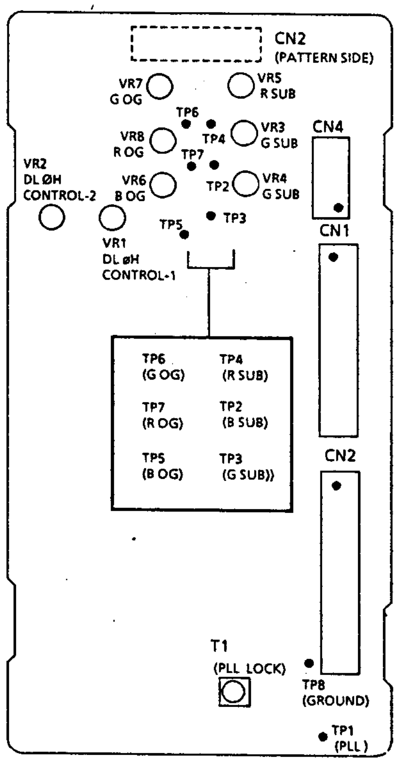
PROCESS BOARD


VR1 R INPUT GAIN
VR3 R FLARE OFFSET
VR10 G FLARE OFFSET
VR9 G FLARE GAIN
VR36 G + 18dB SHTR FLARE
VR6 R + 18dB SHTR GAMMA
VR5 R + 18dB GAMMA
VR34 R + 18dB SHTR FLARE
VR2 R FLARE GAIN
TP3 (R DTL)
TP22 (R FLARE OUT)
CT1
R FREQ
VR1
VR4 R WHITE CLIP
VR30 R GAMMA
VR21 R PULSE CANCEL
VR22 R SHTR PULSE CANCEL
VR27 R PEDESTAL LEVEL
VR8 G INPUT GAIN
VR11 G WHITE CLIP
VR31 G GAMMA
VR23 G PULSE CANCEL
VR24 G SHTR PULSE CANCEL
VR28 G PEDESTAL LEVEL
VR14 B INPUT GAIN
VR17 B WHITE CLIP
VR32 B GAMMA
VR25 B PULSE CANEL
TP12 (R GAIN)
TP4 (R BLK CLIP)
VR3
HIC 2 (R)
VR2 R REF VOLTAGE
VR3 R KNEE SLOPE
VR1 R KNEE POINT
TP5 (R PROCESS IN)
VR12 G + 18dB GAMMA
VR12
TP25 (GND)
VR13 G + 18dB SHTR GAMMA
VR13
TP9 (G DTL)
TP6 (R OUT)
VR41 R DL GAIN
TP23 (G FLARE OUT)
VR7 R GAIN
VR39 R-Y MATRIX
TP1 (R IN)
VR10
VR9
CT2
G FREQ
VR36
TP8 (G GAIN)
HIC 4 (G)
VR2 G REF VOLTAGE
VR3 G KNEE SLOPE
VR1 G KNEE POINT
TP10 (G BLK CLIP)
TP7 (G IN)
VR42 G DL GAIN
TP12 (G OUT)
TP24 (B FLARE OUT)
TP11 (G PROCESS IN)
SW3 KNEE ADJ
OFF
ON
TP15 (B DTL)
VR43 B DL GAIN
CN1
CT3 B FREQ
VR38 B + 18dB SHTR FLARE
VR35
SW2
SW2 MATRIX ON/OFF SWITCH
OFF
ON
SW1
SW1 GAMMA ON/OFF SWITCH
OFF
ON
HIC 6 (B)
VR2 B REF VOLTAGE
VR3 B KNEE SLOPE
VR1 B KNEE POINT
TP16
TP21
TP19
VR37
TP20
VR33
VR26
TP14
VR35 G UP/SHTR FOS
VR37 B UP/SHTR FOS
VR26 B SHTR PULSE CANCEL
VR33 R UP/SHTR FOS
TP17 (B PROCESS IN)
TP13 (B IN)
TP18 (B OUT)
VR15 B FLARE GAIN
VR29 B PEDESTAL LEVEL
VR19 B + 18dB SHTR GAMMA
VR18 B + 18dB GAMMA
VR20 B GAIN
VR40 B-Y MATRIX
VR16 B FLARE OFFSET
TP16 (B BLK CLIP)
TP19 (R UP/SHTR FOS)
TP20 (G UP/SHTR FOS)
TP21 (B UP/SHTR FOS)

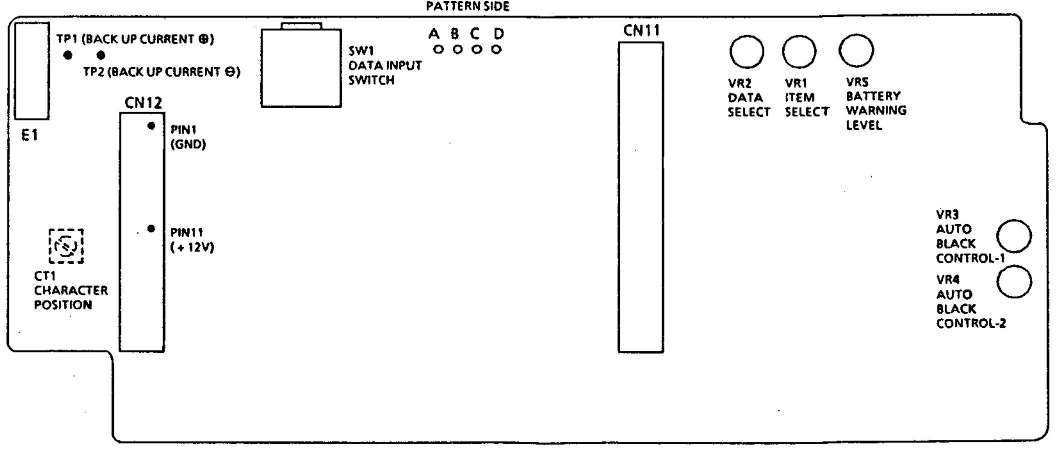
PREAMP BOARD


CN3
CN2
TP11 (G IN GND)
TP10 (G CCD OUT)
CN4
VR101 R DC BIAS ADJ
TP1 (G SH)
VR201 G DC BIAS ADJ
VR301 B DC BIAS ADJ
TP12 (G SH OUT)
TP2 (R PRE)
TP4 (G PRE)
TP5 (DL øH)
TP3 (G PRE)
CF301
CF201
CF101
TP9 (GND)
TP8 (B OUT)
TP6 (R OUT)
TP7 (G OUT)
E1
E2

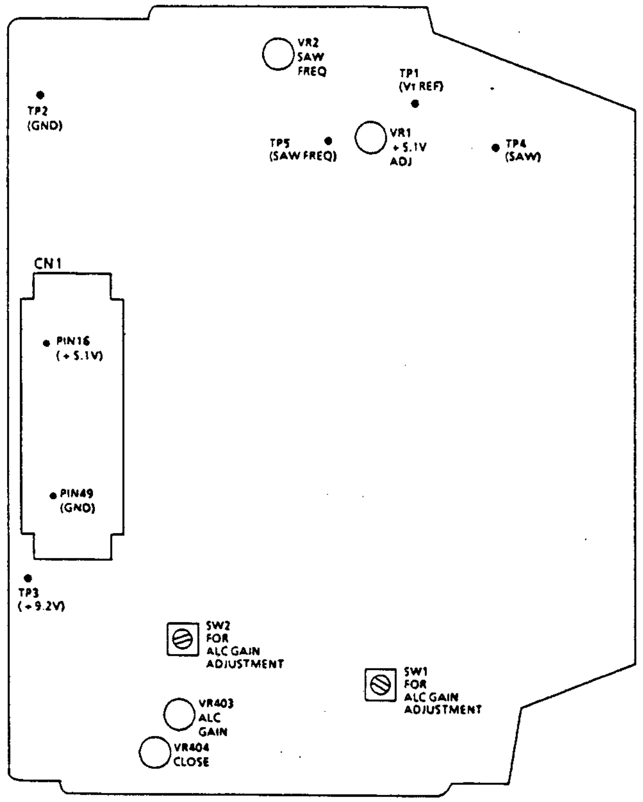
DRIVE BOARD


CN2 (PATTERN SIDE)
VR7 G OG
VR5 R SUB
TP6
VR8 R OG
TP4
VR3 G SUB
CN4
TP7
VR2 DL ØH CONTROL-2
VR6 B OG
TP2
VR4 G SUB
TP5
TP3
CN1
VR1 DL øH CONTROL-1
TP6 (G OG)
TP4 (R SUB)
TP7 (R OG)
TP2 (B SUB)
TP5 (B OG)
TP3 (G SUB))
CN2
T1 (PLL LOCK)
TP8 (GROUND)
TP1 (PLL)

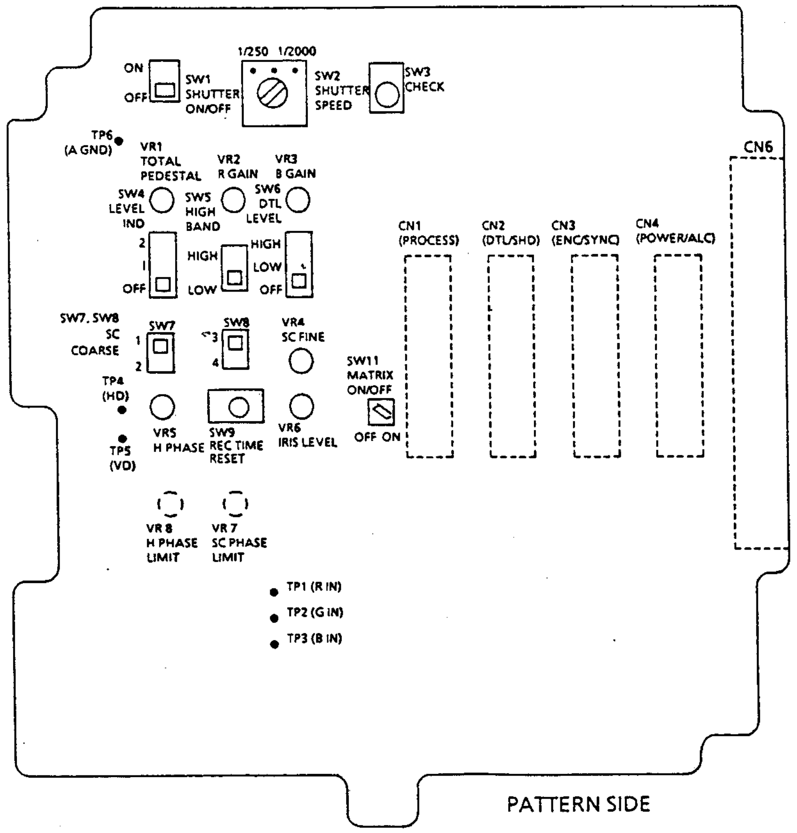
AUTO BOARD


PATTERN SIDE
TP1 (BACK UP CURRENT ⊕)
TP2 (BACK UP CURRENT ⊖)
SW1 DATA INPUT SWITCH
A B C D
CN11
VR2 DATA SELECT
VR1 ITEM SELECT
VR5 BATTERY WARNING LEVEL
CN12
E1
PIN1 (GND)
PIN11 (+12V)
CT1 CHARACTER POSITION
VR3 AUTO BLACK CONTROL-1
VR4 AUTO BLACK CONTROL-2

POWER/ALC BOARD


VR2
SAW
FREQ
TP1
(VT REF)
TP2
(GND)
TP5
(SAW FREQ)
VR1
+5.1V
ADJ
TP4
(SAW)
CN1
PIN16
(+5.1V)
PIN49
(GND)
TP3
(+9.2V)
SW2
FOR
ALC GAIN
ADJUSTMENT
SW1
FOR
ALC GAIN
ADJUSTMENT
VR403
ALC
GAIN
VR404
CLOSE

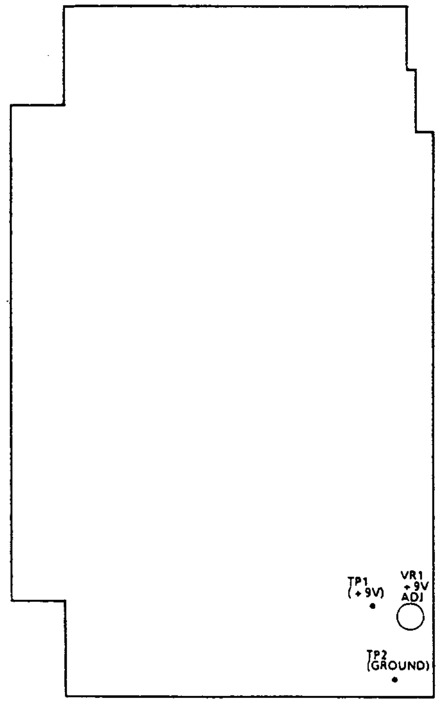
MOTHER BOARD


1/250 1/2000
ON
OFF
SW1
SHUTTER
ON/OFF
SW2
SHUTTER
SPEED
SW3
CHECK
TP6
(A GND)
VR1
TOTAL
PEDESTAL
VR2
R GAIN
VR3
B GAIN
SW4
LEVEL
IND
SW5
HIGH
BAND
SW6
DTL
LEVEL
2
1
OFF
HIGH
LOW
HIGH
LOW
OFF
CN1
(PROCESS)
CN2
(DTL/SHD)
CN3
(ENC/SYNC)
CN4
(POWER/ALC)
CN6
SW7, SW8
SC
COARSE
SW7
1
2
SW8
3
4
VR4
SC FINE
SW11
MATRIX
ON/OFF
OFF ON
TP4
(HD)
TP5
(VD)
VR5
H PHASE
SW9
REC TIME
RESET
VR6
IRIS LEVEL
VR 8
H PHASE
LIMIT
VR 7
SC PHASE
LIMIT
TP1 (R IN)
TP2 (G IN)
TP3 (B IN)

PATTERN SIDE

< Camera Adaptor >

MAIN BOARD


TP1
(+9V)
VR1
+9V
ADJ
TP2
(GROUND)

Service Manual

PAL Colour Video Camera

WV-F350E Series

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views

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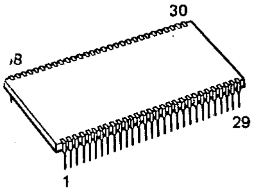
APPEARANCE OF IC, TRANSISTOR AND DIODE-1

YWHB71



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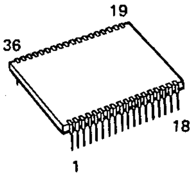

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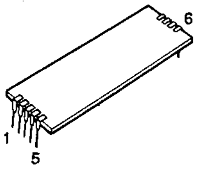

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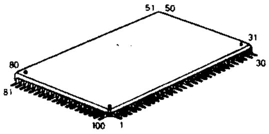
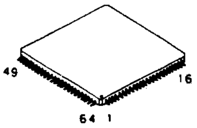


51 50
31
80
30
81
100 1

YWD75112F



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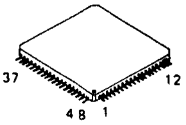

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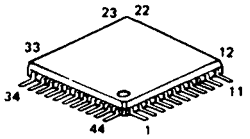
MN53010LVN



23 22
33
12
34
11
44
1

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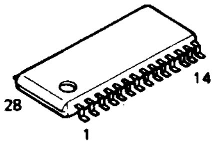

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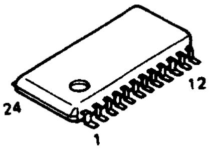

MN74HC221S
MN74HC367S
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MN74HC4053S
MN4049BS
MN4050BS
MN4051BS
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MN4528BS
MN4532BS
MN4538BS
NJU4051BM
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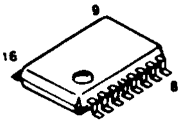
HD14572UBFP
UPD6142G-101



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MN74HC08S
MN74HC21S
MN74HC74S
MN74HCU04S
MN4001BS
MN4011BS
MN4023BS
MN4070BS
MN4071BS
MN4081BS
NJM2901M
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YWCX20095A
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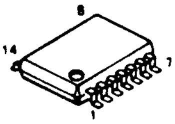

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BA226AF
NJM2903M
NJM2904M
NJM592M8
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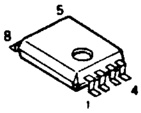

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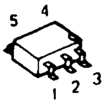
YWTC4S66FR
YWTC4S69F
YWTC7S00FR
YWTC7S02FR
YWTC4S71FR
YWTC4S81FR
YWTC7S04FR



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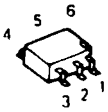
XN4601
XN6501
XN6534



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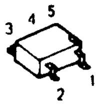

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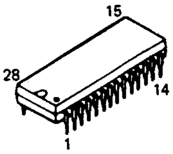

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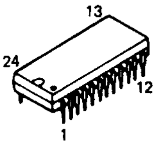

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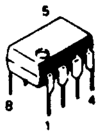

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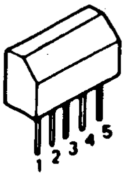

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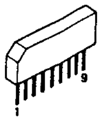

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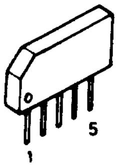
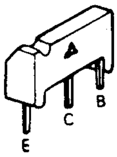


2SD973-QRS
2SD973A-RS
2SB793-RS
2SB793A-RS



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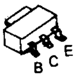

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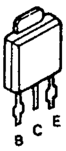

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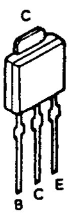
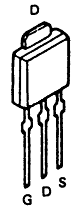


APPEARANCE OF IC, TRANSISTOR AND DIODE-2

2SJ132



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2SA1531-ST
2SA1532-CD
2SB709-RS
2SB1218-QRS
2SB1219-QRS
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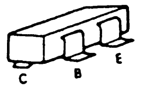
2SD601-RS
2SD602-RS
2SD602-QRS
2SD1819-QRS



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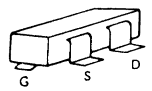
2SK198-P



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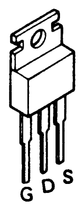
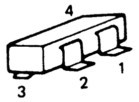
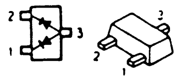


3SK157T



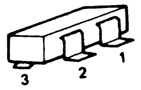
1: Substrate
2: Gate
3: Source
4: Drain

MA143



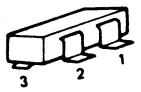
1: Anode
2: Anode
3: Cathode

MA151K
MA141K



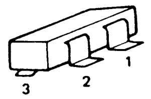
1: NC
2: Anode
3: Cathode

MA151WK
MA141WK



1: Anode
2: Anode
3: Cathode

MA151WA
MA141WA



1: Cathode
2: Cathode
3: Anode

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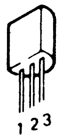

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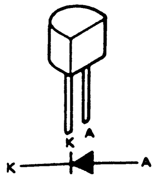

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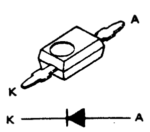
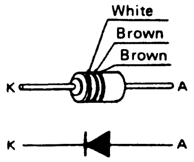
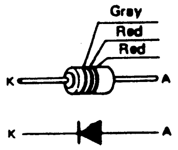


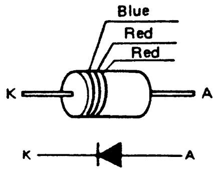
MA4091M


White
Brown
Brown
K
A
K
A

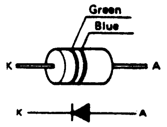
MA4082M


Gray
Red
Red
K
A
K
A

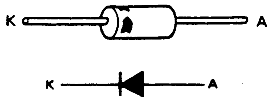
MA1062-L


Blue
Red
Red
K
A
K
A

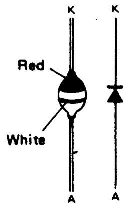
1SS97-2


Green
Blue
K
A
K
A

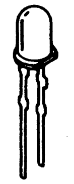
YWERA81004



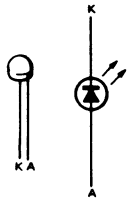
V03G


K
K
Red
White
A
A

LN11WP23



LN21RPH



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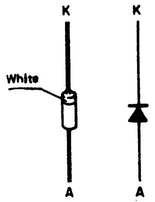
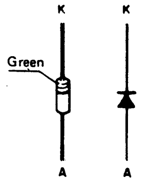
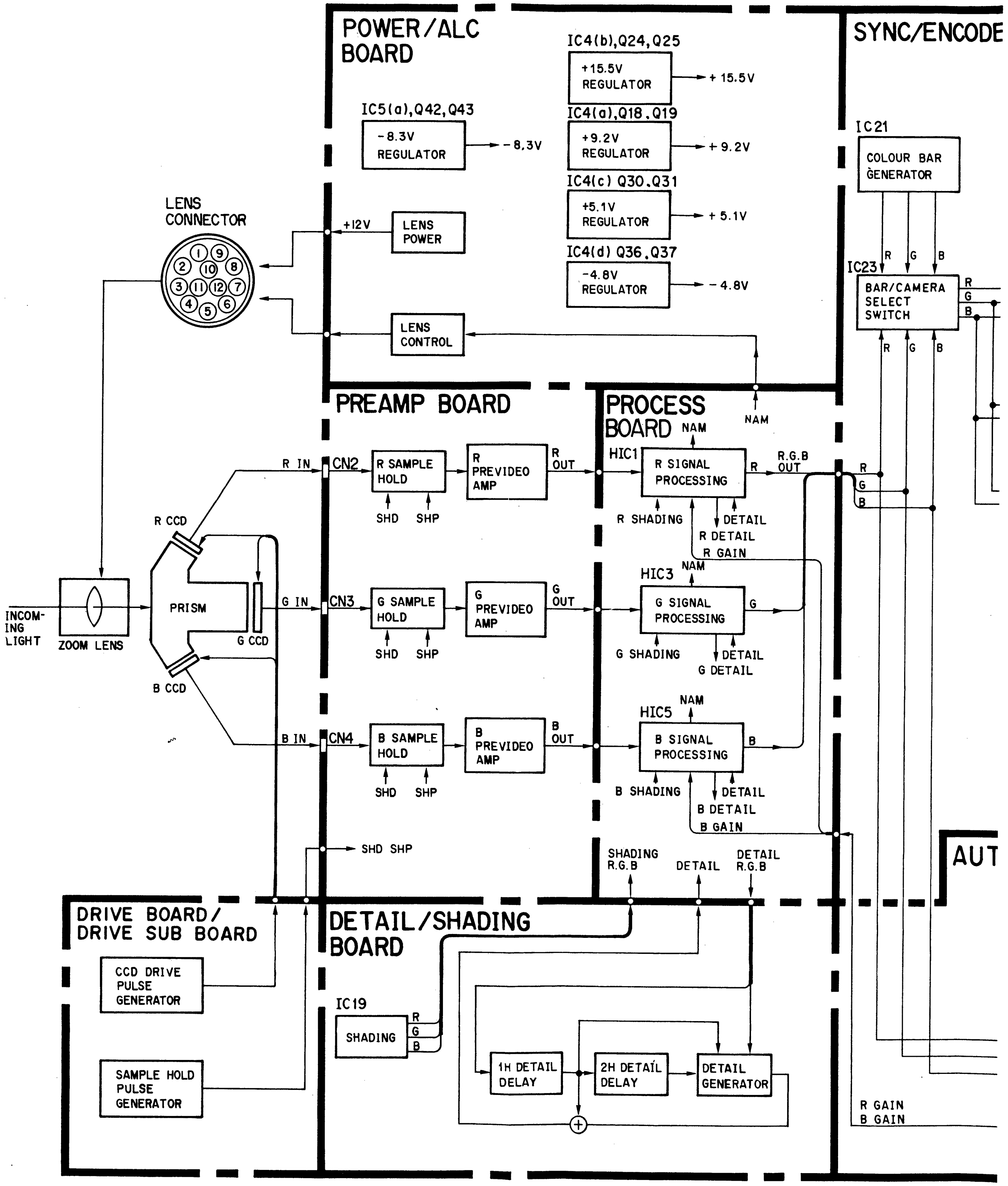


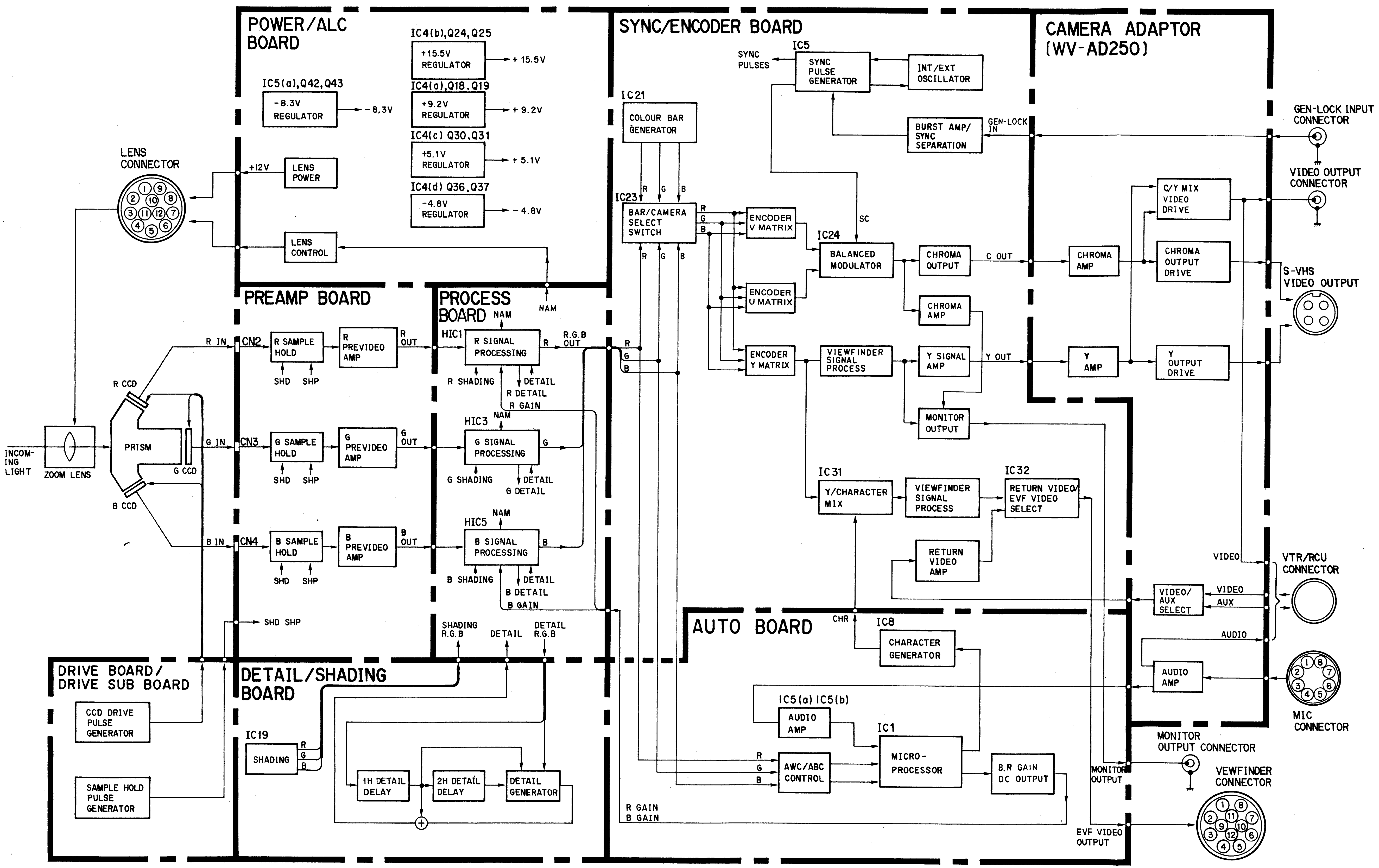
YW1SV73B



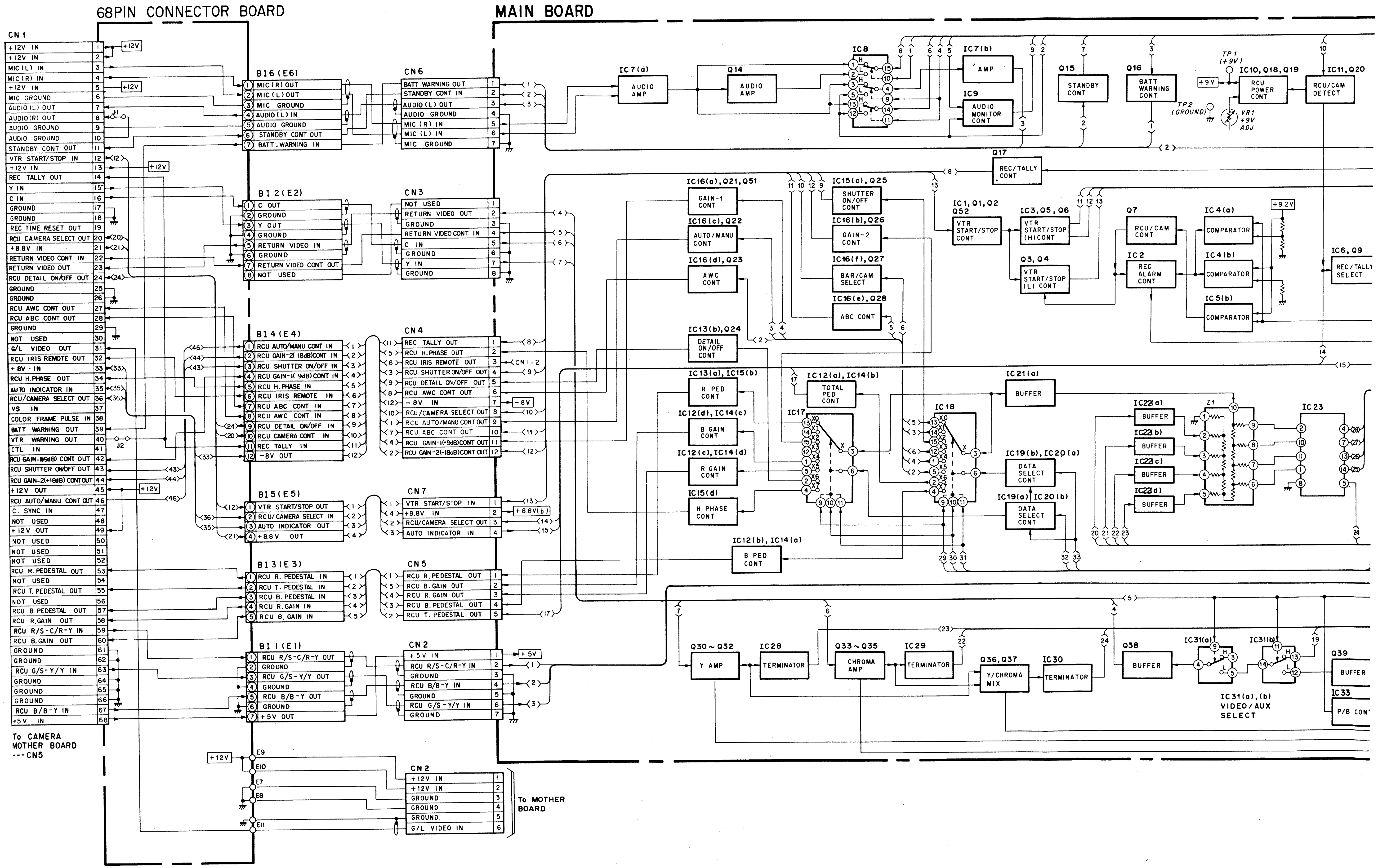
OUTLINE BLOCK D


POWER/ALC BOARD
IC4(b),Q24,Q25
+15.5V REGULATOR
+ 15.5V
IC5(a),Q42,Q43
-8.3V REGULATOR
- 8.3V
IC4(a),Q18,Q19
+9.2V REGULATOR
+ 9.2V
IC4(c) Q30,Q31
+5.1V REGULATOR
+ 5.1V
IC4(d) Q36,Q37
-4.8V REGULATOR
- 4.8V
+12V
LENS POWER
LENS CONTROL
LENS CONNECTOR
1 2 3 4 5 6 7 8 9 10 11 12
SYNC/ENCODE
IC21
COLOUR BAR GENERATOR
IC23
R G B
BAR/CAMERA SELECT SWITCH
R G B
R G B
PREAMP BOARD
PROCESS BOARD
NAM
NAM
R IN
CN2
R SAMPLE HOLD
R PREVIDEO AMP
R OUT
HIC1
R SIGNAL PROCESSING
R
R.G.B OUT
SHD SHP
R SHADING
DETAIL
R DETAIL
R GAIN
R CCD
G IN
CN3
G SAMPLE HOLD
G PREVIDEO AMP
G OUT
HIC3
NAM
G SIGNAL PROCESSING
G
G SHADING
DETAIL
G DETAIL
INCOM-ING LIGHT
ZOOM LENS
PRISM
G CCD
B CCD
B IN
CN4
B SAMPLE HOLD
B PREVIDEO AMP
B OUT
HIC5
NAM
B SIGNAL PROCESSING
B
B SHADING
DETAIL
B DETAIL
B GAIN
SHD SHP
SHADING R.G.B
DETAIL
DETAIL R.G.B
R G B
AUT
DRIVE BOARD/ DRIVE SUB BOARD
CCD DRIVE PULSE GENERATOR
SAMPLE HOLD PULSE GENERATOR
DETAIL/SHADING BOARD
IC19
SHADING
R G B
1H DETAIL DELAY
2H DETAIL DELAY
DETAIL GENERATOR
+
R GAIN
B GAIN

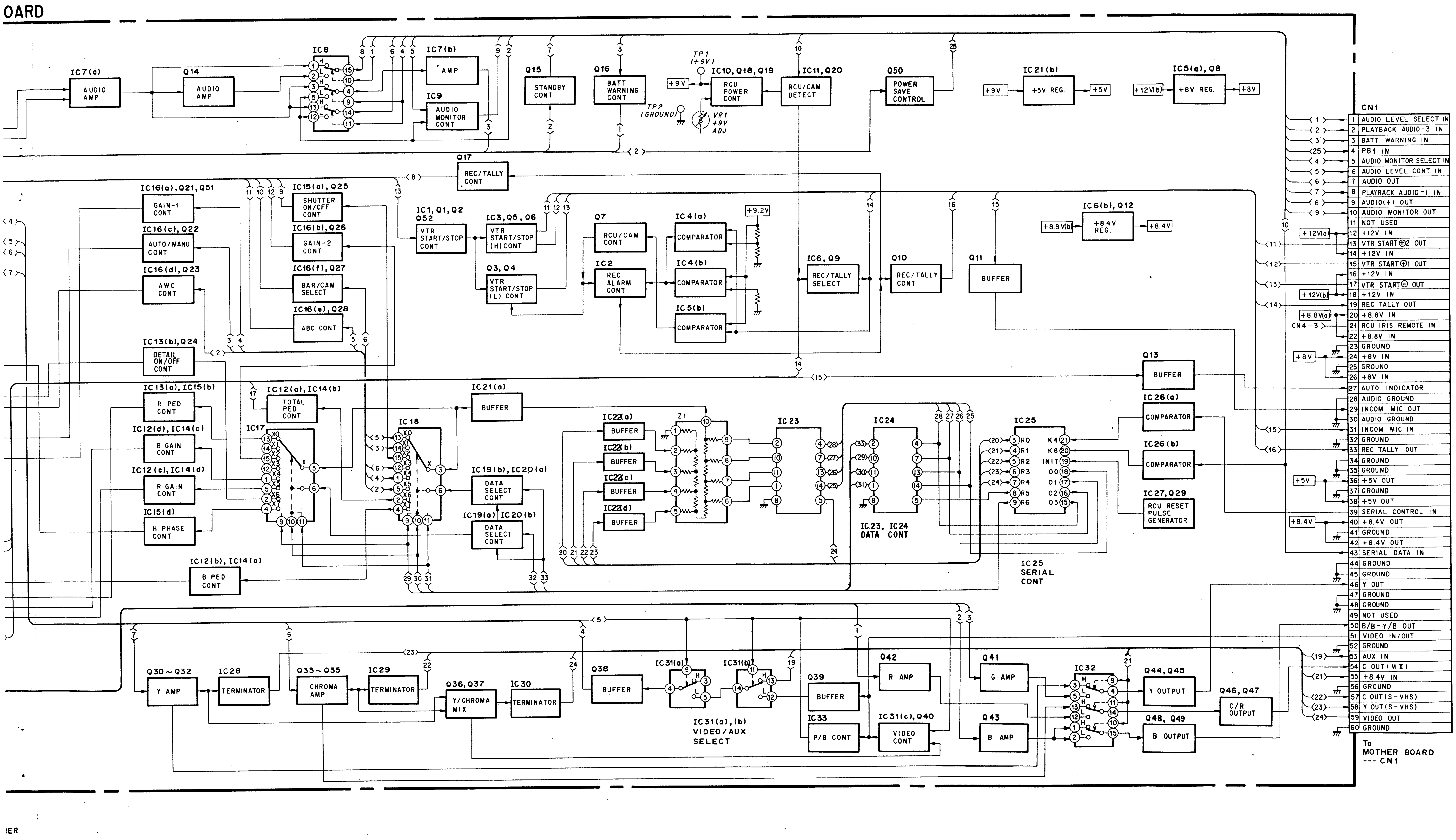
OUTLINE BLOCK DIAGRAM


POWER/ALC BOARD
IC4(b),Q24,Q25
+15.5V REGULATOR
+ 15.5V
IC5(a),Q42,Q43
-8.3V REGULATOR
- 8.3V
IC4(a),Q18,Q19
+9.2V REGULATOR
+ 9.2V
IC4(c) Q30,Q31
+5.1V REGULATOR
+ 5.1V
IC4(d) Q36,Q37
-4.8V REGULATOR
- 4.8V
+12V
LENS POWER
LENS CONTROL
LENS CONNECTOR
SYNC/ENCODER BOARD
SYNC PULSES
IC5
SYNC PULSE GENERATOR
INT/EXT OSCILLATOR
IC21
COLOUR BAR GENERATOR
BURST AMP/ SYNC SEPARATION
GEN-LOCK IN
IC23
BAR/CAMERA SELECT SWITCH
R
G
B
ENCODER V MATRIX
ENCODER U MATRIX
ENCODER Y MATRIX
SC
IC24
BALANCED MODULATOR
CHROMA OUTPUT
C OUT
CHROMA AMP
VIEWFINDER SIGNAL PROCESS
Y SIGNAL AMP
Y OUT
MONITOR OUTPUT
CAMERA ADAPTOR (WV-AD250)
GEN-LOCK INPUT CONNECTOR
VIDEO OUTPUT CONNECTOR
C/Y MIX VIDEO DRIVE
CHROMA AMP
CHROMA OUTPUT DRIVE
S-VHS VIDEO OUTPUT
Y AMP
Y OUTPUT DRIVE
PREAMP BOARD
PROCESS BOARD
NAM
R IN
CN2
R SAMPLE HOLD
R PREVIDEO AMP
R OUT
SHD
SHP
HIC1
R SIGNAL PROCESSING
R.G.B OUT
R SHADING
DETAIL
R DETAIL
R GAIN
R CCD
INCOM- ING LIGHT
ZOOM LENS
PRISM
G CCD
B CCD
G IN
CN3
G SAMPLE HOLD
G PREVIDEO AMP
G OUT
HIC3
G SIGNAL PROCESSING
G SHADING
G DETAIL
B IN
CN4
B SAMPLE HOLD
B PREVIDEO AMP
B OUT
HIC5
B SIGNAL PROCESSING
B SHADING
B DETAIL
B GAIN
SHD SHP
SHADING R.G.B
DETAIL R.G.B
IC31
Y/CHARACTER MIX
VIEWFINDER SIGNAL PROCESS
IC32
RETURN VIDEO/ EVF VIDEO SELECT
RETURN VIDEO AMP
VIDEO
VTR/RCU CONNECTOR
VIDEO/ AUX SELECT
AUX
AUDIO
AUTO BOARD
CHR
IC8
CHARACTER GENERATOR
AUDIO AMP
MIC CONNECTOR
IC5(a) IC5(b)
AUDIO AMP
IC1
MICRO- PROCESSOR
AWC/ABC CONTROL
B.R GAIN DC OUTPUT
MONITOR OUTPUT
MONITOR OUTPUT CONNECTOR
VEWFINDER CONNECTOR
EVF VIDEO OUTPUT
R GAIN
B GAIN
DRIVE BOARD/ DRIVE SUB BOARD
CCD DRIVE PULSE GENERATOR
SAMPLE HOLD PULSE GENERATOR
DETAIL/SHADING BOARD
IC19
SHADING
1H DETAIL DELAY
2H DETAIL DELAY
DETAIL GENERATOR

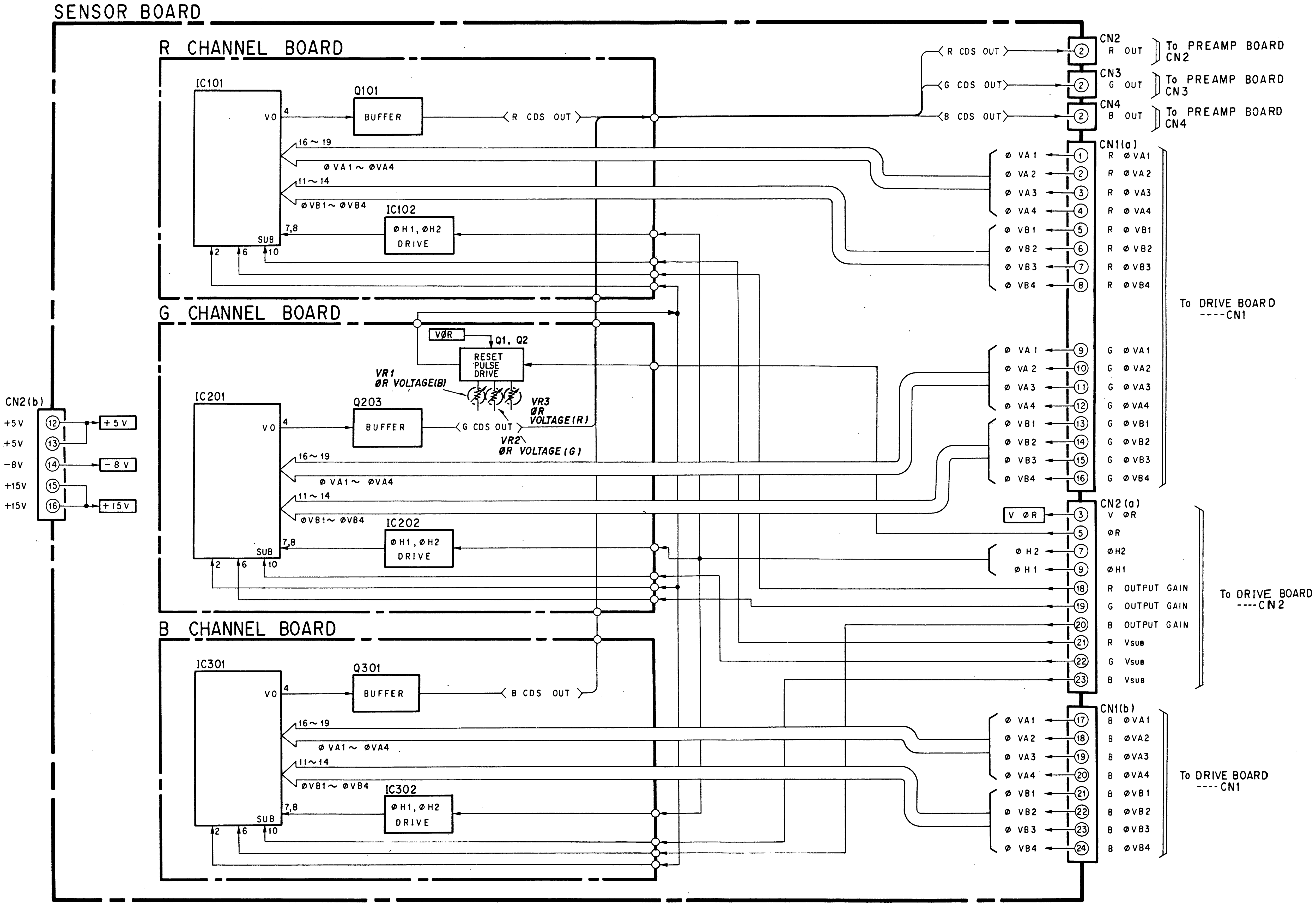
BLOCK DIAGRAM OF CAMERA ADAPTOR


68PIN CONNECTOR BOARD
MAIN BOARD
CN 1
+12V IN
+12V IN
MIC (L) IN
MIC (R) IN
+12V IN
MIC GROUND
AUDIO (L) OUT
AUDIO (R) OUT
AUDIO GROUND
AUDIO GROUND
STANDBY CONT OUT
VTR START/STOP IN
+12V IN
REC TALLY OUT
Y IN
C IN
GROUND
GROUND
REC TIME RESET OUT
RCU CAMERA SELECT OUT
+8.8V IN
RETURN VIDEO CONT IN
RETURN VIDEO OUT
RCU DETAIL ON/OFF OUT
GROUND
GROUND
RCU AWC CONT OUT
RCU ABC CONT OUT
GROUND
NOT USED
G/L VIDEO OUT
RCU IRIS REMOTE OUT
+8V IN
RCU H.PHASE OUT
AUTO INDICATOR IN
RCU/CAMERA SELECT OUT
VS IN
COLOR FRAME PULSE IN
BATT WARNING OUT
VTR WARNING OUT
CTL IN
RCU GAIN-1(+9dB) CONT OUT
RCU SHUTTER ON/OFF OUT
RCU GAIN-2(+18dB) CONT OUT
+12V OUT
RCU AUTO/MANU CONT OUT
C. SYNC IN
NOT USED
+12V OUT
NOT USED
NOT USED
NOT USED
RCU R.PEDESTAL OUT
NOT USED
RCU T.PEDESTAL OUT
NOT USED
RCU B.PEDESTAL OUT
RCU R.GAIN OUT
RCU R/S-C/R-Y IN
RCU B.GAIN OUT
GROUND
GROUND
RCU G/S-Y/Y IN
GROUND
GROUND
GROUND
RCU B/B-Y IN
+5V IN
J2
+12V
To CAMERA MOTHER BOARD ---CN5
BI6 (E6)
MIC (R) OUT
MIC (L) OUT
MIC GROUND
AUDIO (L) IN
AUDIO GROUND
STANDBY CONT OUT
BATT WARNING IN
BI2 (E2)
C OUT
GROUND
Y OUT
GROUND
RETURN VIDEO IN
GROUND
RETURN VIDEO CONT OUT
NOT USED
BI4 (E4)
RCU AUTO/MANU CONT IN
RCU GAIN-2(18dB) CONT IN
RCU SHUTTER ON/OFF IN
RCU GAIN-1(9dB) CONT IN
RCU H.PHASE IN
RCU IRIS REMOTE IN
RCU ABC CONT IN
RCU AWC CONT IN
RCU DETAIL ON/OFF IN
RCU CAMERA CONT IN
REC TALLY IN
-8V OUT
BI5 (E5)
VTR START/STOP OUT
RCU/CAMERA SELECT IN
AUTO INDICATOR OUT
+8.8V OUT
BI3 (E3)
RCU R. PEDESTAL IN
RCU T. PEDESTAL IN
RCU B. PEDESTAL IN
RCU R.GAIN IN
RCU B. GAIN IN
BI1 (E1)
RCU R/S-C/R-Y OUT
GROUND
RCU G/S-Y/Y OUT
GROUND
RCU B/B-Y OUT
GROUND
+5V OUT
E9
E10
E7
E8
E11
CN6
BATT WARNING OUT
STANDBY CONT IN
AUDIO (L) OUT
AUDIO GROUND
MIC (R) IN
MIC (L) IN
MIC GROUND
CN3
NOT USED
RETURN VIDEO OUT
GROUND
RETURN VIDEO CONT IN
C IN
GROUND
Y IN
GROUND
CN4
REC TALLY OUT
RCU H.PHASE OUT
RCU IRIS REMOTE OUT
RCU SHUTTER ON/OFF OUT
RCU DETAIL ON/OFF OUT
RCU AWC CONT OUT
-8V IN
RCU/CAMERA SELECT OUT
RCU AUTO/MANU CONT OUT
RCU ABC CONT OUT
RCU GAIN-1(+9dB) CONT OUT
RCU GAIN-2(-18dB) CONT OUT
-8V
CN1-2
CN7
VTR START/STOP IN
+8.8V IN
RCU/CAMERA SELECT OUT
AUTO INDICATOR IN
+8.8V(b)
CN5
RCU R.PEDESTAL OUT
RCU B.GAIN OUT
RCU R.GAIN OUT
RCU B.PEDESTAL OUT
RCU T.PEDESTAL OUT
CN2
+5V IN
RCU R/S-C/R-Y IN
GROUND
RCU B/B-Y IN
GROUND
RCU G/S-Y/Y IN
GROUND
+5V
CN2
+12V IN
+12V IN
GROUND
GROUND
GROUND
G/L VIDEO IN
To MOTHER BOARD
IC7(a) AUDIO AMP
Q14 AUDIO AMP
IC8
IC7(b) AMP
IC9 AUDIO MONITOR CONT
Q15 STANDBY CONT
Q16 BATT WARNING CONT
TP1 (+9V)
TP2 (GROUND)
+9V
IC10, Q18, Q19 RCU POWER CONT
VR1 +9V ADJ
IC11, Q20 RCU/CAM DETECT
Q17 REC/TALLY CONT
IC16(a), Q21, Q51 GAIN-1 CONT
IC16(c), Q22 AUTO/MANU CONT
IC16(d), Q23 AWC CONT
IC15(c), Q25 SHUTTER ON/OFF CONT
IC16(b), Q26 GAIN-2 CONT
IC16(f), Q27 BAR/CAM SELECT
IC16(e), Q28 ABC CONT
IC13(b), Q24 DETAIL ON/OFF CONT
IC13(a), IC15(b) R PED CONT
IC12(d), IC14(c) B GAIN CONT
IC12(c), IC14(d) R GAIN CONT
IC15(d) H PHASE CONT
IC12(b), IC14(a) B PED CONT
IC12(a), IC14(b) TOTAL PED CONT
IC17
IC18
IC1, Q1, Q2 Q52 VTR START/STOP CONT
IC3, Q5, Q6 VTR START/STOP (H) CONT
Q3, Q4 VTR START/STOP (L) CONT
Q7 RCU/CAM CONT
IC2 REC ALARM CONT
+9.2V
IC4(a) COMPARATOR
IC4(b) COMPARATOR
IC5(b) COMPARATOR
IC6, Q9 REC/TALLY SELECT
IC21(a) BUFFER
IC19(b), IC20(a) DATA SELECT CONT
IC19(a) IC20(b) DATA SELECT CONT
IC22(a) BUFFER
IC22(b) BUFFER
IC22(c) BUFFER
IC22(d) BUFFER
Z1
IC23
Q30~Q32 Y AMP
IC28 TERMINATOR
Q33~Q35 CHROMA AMP
IC29 TERMINATOR
Q36, Q37 Y/CHROMA MIX
IC30 TERMINATOR
Q38 BUFFER
IC31(a)
IC31(b)
IC31(a), (b) VIDEO/AUX SELECT
Q39 BUFFER
IC33 P/B CON

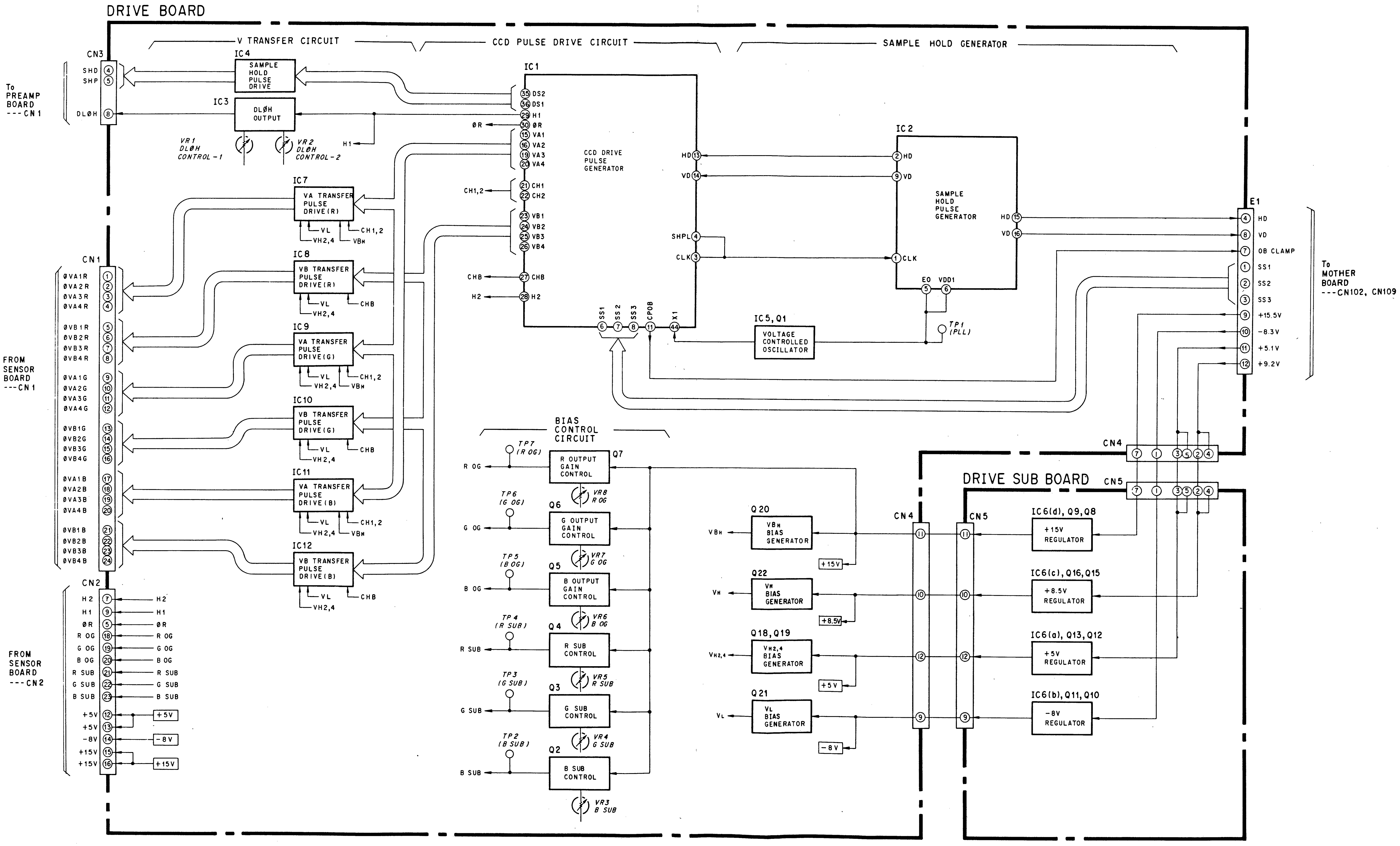
BLOCK DIAGRAM OF CAMERA ADAPTOR


OARD
IC7(a)
AUDIO AMP
Q14
AUDIO AMP
IC8
IC7(b)
AMP
IC9
AUDIO MONITOR CONT
Q15
STANDBY CONT
Q16
BATT WARNING CONT
TP1 (+9V)
IC10, Q18, Q19
+9V
RCU POWER CONT
TP2 (GROUND)
VR1 +9V ADJ
IC11, Q20
RCU/CAM DETECT
Q50
POWER SAVE CONTROL
IC21(b)
+9V
+5V REG.
+5V
IC5(a), Q8
+12V(b)
+8V REG.
+8V
Q17
REC/TALLY CONT
IC16(a), Q21, Q51
GAIN-1 CONT
IC16(c), Q22
AUTO/MANU CONT
IC16(d), Q23
AWC CONT
IC15(c), Q25
SHUTTER ON/OFF CONT
IC16(b), Q26
GAIN-2 CONT
IC16(f), Q27
BAR/CAM SELECT
IC16(e), Q28
ABC CONT
IC1, Q1, Q2 Q52
VTR START/STOP CONT
IC3, Q5, Q6
VTR START/STOP (H) CONT
Q3, Q4
VTR START/STOP (L) CONT
Q7
RCU/CAM CONT
IC2
REC ALARM CONT
IC4(a)
COMPARATOR
IC4(b)
COMPARATOR
IC5(b)
COMPARATOR
+9.2V
IC6, Q9
REC/TALLY SELECT
Q10
REC/TALLY CONT
Q11
BUFFER
IC6(b), Q12
+8.8V(b)
+8.4V REG.
+8.4V
IC13(b), Q24
DETAIL ON/OFF CONT
IC13(a), IC15(b)
R PED CONT
IC12(a), IC14(b)
TOTAL PED CONT
IC12(d), IC14(c)
B GAIN CONT
IC12(c), IC14(d)
R GAIN CONT
IC15(d)
H PHASE CONT
IC17
IC18
IC21(a)
BUFFER
IC19(b), IC20(a)
DATA SELECT CONT
IC19(a), IC20(b)
DATA SELECT CONT
IC12(b), IC14(a)
B PED CONT
IC22(a)
BUFFER
IC22(b)
BUFFER
IC22(c)
BUFFER
IC22(d)
BUFFER
Z1
IC23
IC24
IC23, IC24 DATA CONT
IC25
IC25 SERIAL CONT
Q13
BUFFER
IC26(a)
COMPARATOR
IC26(b)
COMPARATOR
IC27, Q29
RCU RESET PULSE GENERATOR
+12V(a)
+12V(b)
+8.8V(a)
CN4-3
+8V
+5V
+8.4V
Q30~Q32
Y AMP
IC28
TERMINATOR
Q33~Q35
CHROMA AMP
IC29
TERMINATOR
Q36, Q37
Y/CHROMA MIX
IC30
TERMINATOR
Q38
BUFFER
IC31(a)
IC31(b)
IC31(a), (b) VIDEO/AUX SELECT
Q39
BUFFER
IC33
P/B CONT
IC31(c), Q40
VIDEO CONT
Q42
R AMP
Q41
G AMP
Q43
B AMP
IC32
Q44, Q45
Y OUTPUT
Q48, Q49
B OUTPUT
Q46, Q47
C/R OUTPUT
CN1
1 AUDIO LEVEL SELECT IN
2 PLAYBACK AUDIO-3 IN
3 BATT WARNING IN
4 PB1 IN
5 AUDIO MONITOR SELECT IN
6 AUDIO LEVEL CONT IN
7 AUDIO OUT
8 PLAYBACK AUDIO-1 IN
9 AUDIO(+) OUT
10 AUDIO MONITOR OUT
11 NOT USED
12 +12V IN
13 VTR START⊕2 OUT
14 +12V IN
15 VTR START⊕1 OUT
16 +12V IN
17 VTR START⊖ OUT
18 +12V IN
19 REC TALLY OUT
20 +8.8V IN
21 RCU IRIS REMOTE IN
22 +8.8V IN
23 GROUND
24 +8V IN
25 GROUND
26 +8V IN
27 AUTO INDICATOR
28 AUDIO GROUND
29 INCOM MIC OUT
30 AUDIO GROUND
31 INCOM MIC IN
32 GROUND
33 REC TALLY OUT
34 GROUND
35 GROUND
36 +5V OUT
37 GROUND
38 +5V OUT
39 SERIAL CONTROL IN
40 +8.4V OUT
41 GROUND
42 +8.4V OUT
43 SERIAL DATA IN
44 GROUND
45 GROUND
46 Y OUT
47 GROUND
48 GROUND
49 NOT USED
50 B/B-Y/B OUT
51 VIDEO IN/OUT
52 GROUND
53 AUX IN
54 C OUT(M II)
55 +8.4V IN
56 GROUND
57 C OUT(S-VHS)
58 Y OUT(S-VHS)
59 VIDEO OUT
60 GROUND
To MOTHER BOARD --- CN1

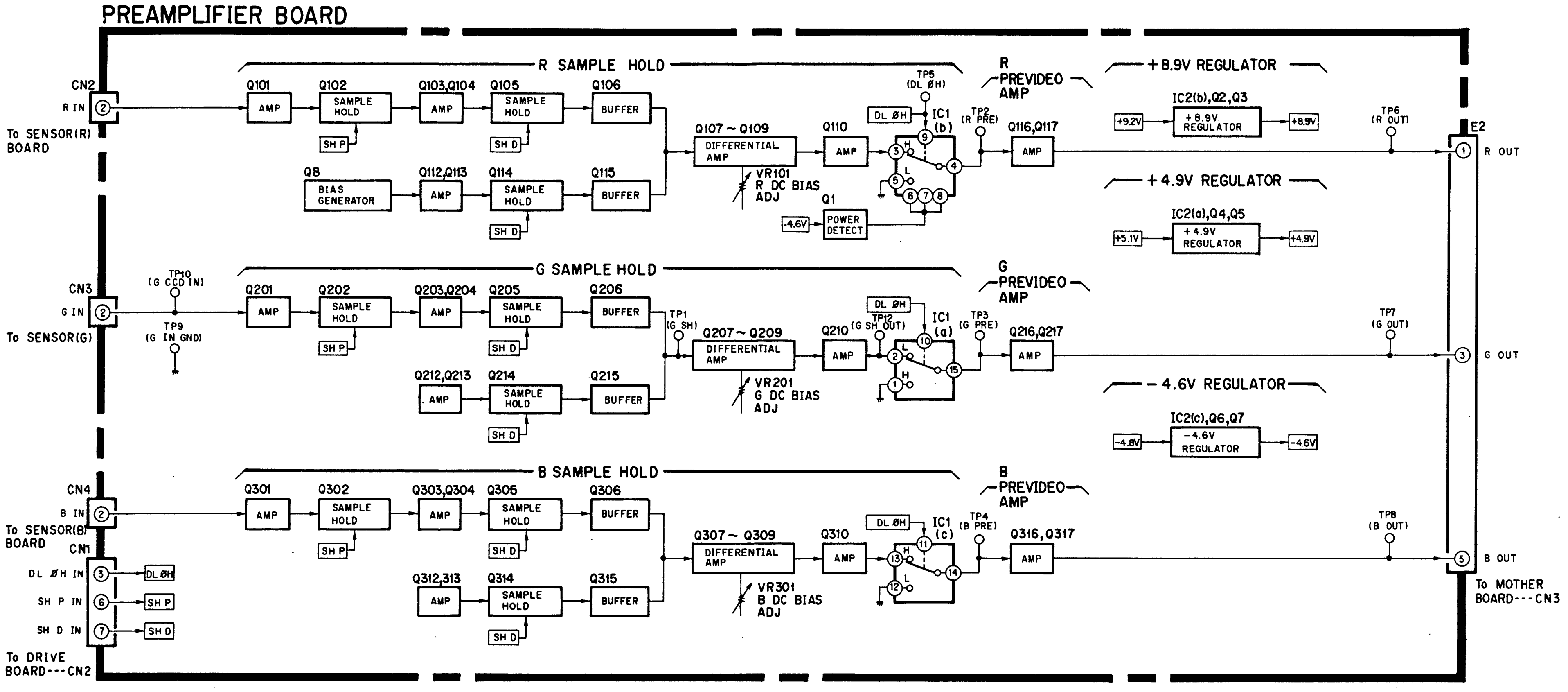
BLOCK DIAGRAM OF SENSOR BOARD


SENSOR BOARD
R CHANNEL BOARD
IC101
VO
4
Q101
BUFFER
R CDS OUT
16~19
ØVA1~ØVA4
11~14
ØVB1~ØVB4
IC102
ØH1, ØH2
DRIVE
7,8
SUB
2
6
10
G CHANNEL BOARD
VØR
Q1, Q2
RESET
PULSE
DRIVE
VR1
ØR VOLTAGE(B)
VR3
ØR
VOLTAGE(R)
VR2
ØR VOLTAGE(G)
IC201
Q203
BUFFER
G CDS OUT
IC202
ØH1, ØH2
DRIVE
B CHANNEL BOARD
IC301
Q301
BUFFER
B CDS OUT
IC302
ØH1, ØH2
DRIVE
CN2(b)
+5V
+5V
−8V
+15V
+15V
12
13
14
15
16
+5V
−8V
+15V
CN2
R OUT
To PREAMP BOARD
CN2
CN3
G OUT
To PREAMP BOARD
CN3
CN4
B OUT
To PREAMP BOARD
CN4
R CDS OUT
G CDS OUT
B CDS OUT
CN1(a)
Ø VA1
Ø VA2
Ø VA3
Ø VA4
Ø VB1
Ø VB2
Ø VB3
Ø VB4
R ØVA1
R ØVA2
R ØVA3
R ØVA4
R ØVB1
R ØVB2
R ØVB3
R ØVB4
G ØVA1
G ØVA2
G ØVA3
G ØVA4
G ØVB1
G ØVB2
G ØVB3
G ØVB4
To DRIVE BOARD
----CN1
CN2(a)
V ØR
ØR
ØH2
ØH1
ØH2
ØH1
R OUTPUT GAIN
G OUTPUT GAIN
B OUTPUT GAIN
R VSUB
G VSUB
B VSUB
To DRIVE BOARD
----CN2
CN1(b)
B ØVA1
B ØVA2
B ØVA3
B ØVA4
B ØVB1
B ØVB2
B ØVB3
B ØVB4
To DRIVE BOARD
----CN1

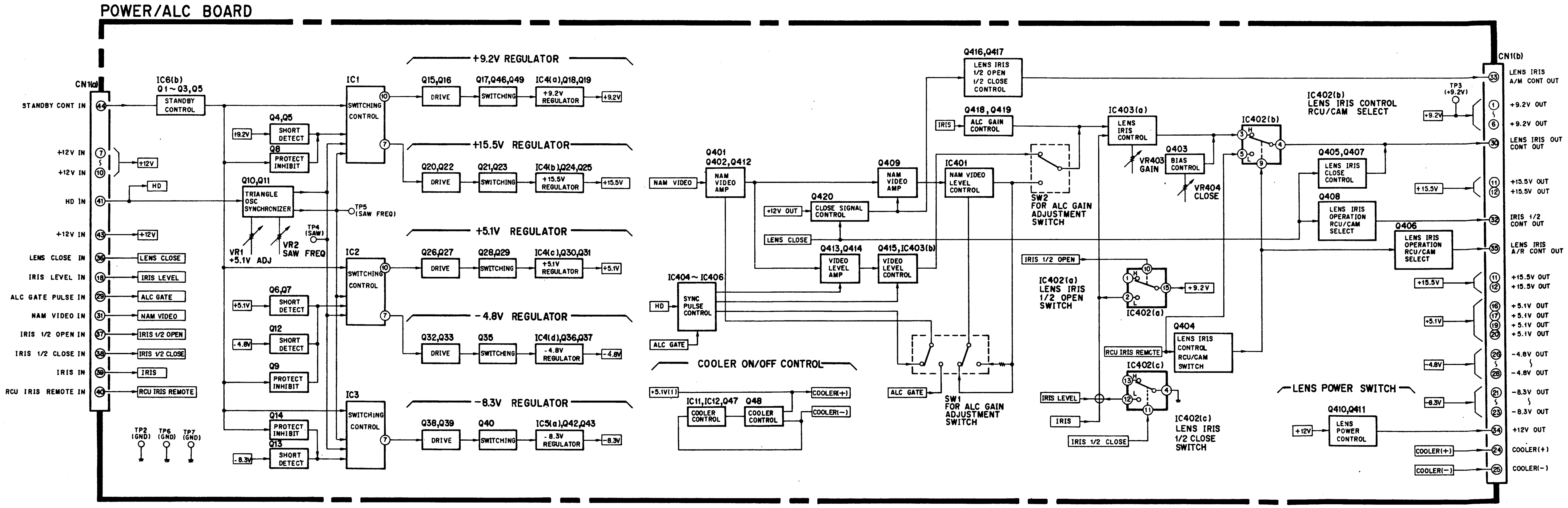
BLOCK DIAGRAM OF DRIVE BOARD


DRIVE BOARD
V TRANSFER CIRCUIT
CCD PULSE DRIVE CIRCUIT
SAMPLE HOLD GENERATOR
CN3
SHD ④
SHP ⑤
DLØH ⑧
To PREAMP BOARD ---CN1
IC4
SAMPLE HOLD PULSE DRIVE
IC3
DLØH OUTPUT
VR1 DLØH CONTROL-1
VR2 DLØH CONTROL-2
H1
IC1
㉟ DS2
㊱ DS1
㉙ H1
㉚ ØR
⑮ VA1
⑯ VA2
⑲ VA3
⑳ VA4
ØR
CH1,2
㉑ CH1
㉒ CH2
㉓ VB1
㉔ VB2
㉕ VB3
㉖ VB4
CHB
㉗ CHB
H2
㉘ H2
CCD DRIVE PULSE GENERATOR
HD ⑬
VD ⑭
SHPL ④
CLK ③
SS1 ⑥
SS2 ⑦
SS3 ⑧
CP0B ⑪
X1 ㊹
IC2
② HD
⑨ VD
① CLK
SAMPLE HOLD PULSE GENERATOR
HD ⑮
VD ⑯
EO ⑤
VDD1 ⑥
TP1 (PLL)
IC5, Q1
VOLTAGE CONTROLLED OSCILLATOR
IC7
VA TRANSFER PULSE DRIVE (R)
IC8
VB TRANSFER PULSE DRIVE (R)
IC9
VA TRANSFER PULSE DRIVE (G)
IC10
VB TRANSFER PULSE DRIVE (G)
IC11
VA TRANSFER PULSE DRIVE (B)
IC12
VB TRANSFER PULSE DRIVE (B)
VL
VH2,4
VBH
CH1,2
CHB
CN1
ØVA1R ①
ØVA2R ②
ØVA3R ③
ØVA4R ④
ØVB1R ⑤
ØVB2R ⑥
ØVB3R ⑦
ØVB4R ⑧
ØVA1G ⑨
ØVA2G ⑩
ØVA3G ⑪
ØVA4G ⑫
ØVB1G ⑬
ØVB2G ⑭
ØVB3G ⑮
ØVB4G ⑯
ØVA1B ⑰
ØVA2B ⑱
ØVA3B ⑲
ØVA4B ⑳
ØVB1B ㉑
ØVB2B ㉒
ØVB3B ㉓
ØVB4B ㉔
FROM SENSOR BOARD ---CN1
CN2
H2 ⑦
H1 ⑨
ØR ⑤
R OG ⑱
G OG ⑲
B OG ⑳
R SUB ㉑
G SUB ㉒
B SUB ㉓
+5V ⑫
+5V ⑬
-8V ⑭
+15V ⑮
+15V ⑯
FROM SENSOR BOARD ---CN2
H2
H1
ØR
R OG
G OG
B OG
R SUB
G SUB
B SUB
+5V
-8V
+15V
BIAS CONTROL CIRCUIT
TP7 (R OG)
R OG
R OUTPUT GAIN CONTROL
Q7
VR8 R OG
TP6 (G OG)
G OG
Q6
G OUTPUT GAIN CONTROL
VR7 G OG
TP5 (B OG)
B OG
Q5
B OUTPUT GAIN CONTROL
VR6 B OG
TP4 (R SUB)
R SUB
Q4
R SUB CONTROL
VR5 R SUB
TP3 (G SUB)
G SUB
Q3
G SUB CONTROL
VR4 G SUB
TP2 (B SUB)
B SUB
Q2
B SUB CONTROL
VR3 B SUB
Q20
VBH
VBH BIAS GENERATOR
+15V
Q22
VH
VH BIAS GENERATOR
+8.5V
Q18, Q19
VH2,4
VH2,4 BIAS GENERATOR
+5V
Q21
VL
VL BIAS GENERATOR
-8V
CN4
⑪
⑩
⑫
⑨
CN5
E1
④ HD
⑧ VD
⑦ OB CLAMP
① SS1
② SS2
③ SS3
⑨ +15.5V
⑩ -8.3V
⑪ +5.1V
⑫ +9.2V
To MOTHER BOARD ---CN102, CN109
CN4
⑦ ① ③ ⑤ ② ④
DRIVE SUB BOARD
CN5
⑦ ① ③ ⑤ ② ④
IC6(d), Q9, Q8
+15V REGULATOR
IC6(c), Q16, Q15
+8.5V REGULATOR
IC6(a), Q13, Q12
+5V REGULATOR
IC6(b), Q11, Q10
-8V REGULATOR

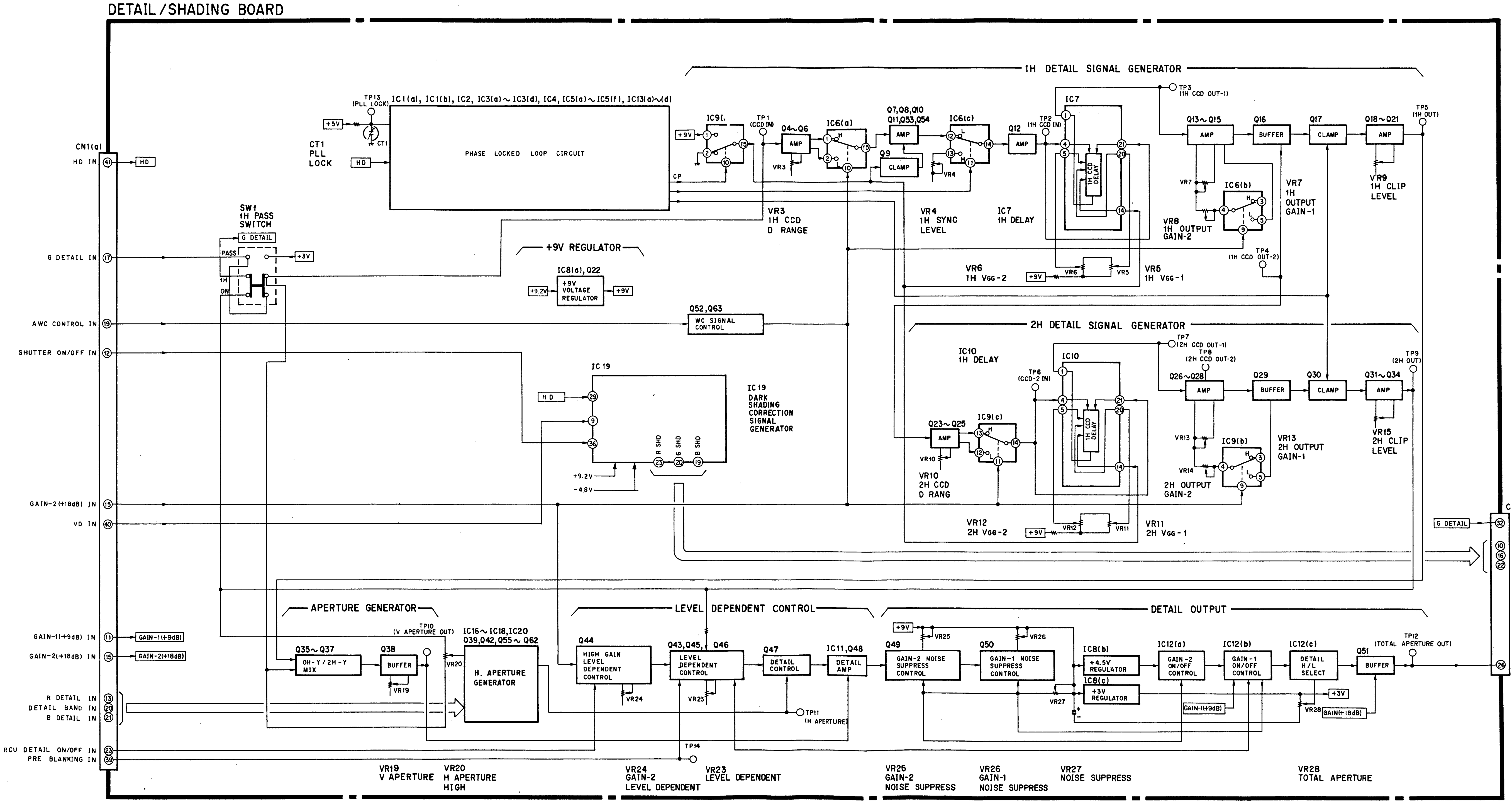
BLOCK DIAGRAM OF PREAMP BOARD


PREAMPLIFIER BOARD
CN2
R IN ②
To SENSOR(R) BOARD
R SAMPLE HOLD
Q101 AMP
Q102 SAMPLE HOLD
SH P
Q103,Q104 AMP
Q105 SAMPLE HOLD
SH D
Q106 BUFFER
Q8 BIAS GENERATOR
Q112,Q113 AMP
Q114 SAMPLE HOLD
Q115 BUFFER
Q107~Q109 DIFFERENTIAL AMP
VR101 R DC BIAS ADJ
Q110 AMP
TP5 (DL ØH)
DL ØH
IC1 (b)
Q1 POWER DETECT
-4.6V
TP2 (R PRE)
R PREVIDEO AMP
Q116,Q117 AMP
+8.9V REGULATOR
IC2(b),Q2,Q3
+9.2V
+8.9V REGULATOR
+8.9V
+4.9V REGULATOR
IC2(a),Q4,Q5
+5.1V
+4.9V REGULATOR
+4.9V
TP6 (R OUT)
E2
① R OUT
CN3
G IN ②
TP10 (G CCD IN)
TP9 (G IN GND)
To SENSOR(G)
G SAMPLE HOLD
Q201 AMP
Q202 SAMPLE HOLD
Q203,Q204 AMP
Q205 SAMPLE HOLD
Q206 BUFFER
Q212,Q213 AMP
Q214 SAMPLE HOLD
Q215 BUFFER
TP1 (G SH)
Q207~Q209 DIFFERENTIAL AMP
VR201 G DC BIAS ADJ
Q210 AMP
TP12 (G SH OUT)
IC1 (a)
TP3 (G PRE)
G PREVIDEO AMP
Q216,Q217 AMP
-4.6V REGULATOR
IC2(c),Q6,Q7
-4.8V
-4.6V REGULATOR
-4.6V
TP7 (G OUT)
③ G OUT
CN4
B IN ②
To SENSOR(B) BOARD
CN1
DL ØH IN ③
SH P IN ⑥
SH D IN ⑦
To DRIVE BOARD---CN2
B SAMPLE HOLD
Q301 AMP
Q302 SAMPLE HOLD
Q303,Q304 AMP
Q305 SAMPLE HOLD
Q306 BUFFER
Q312,313 AMP
Q314 SAMPLE HOLD
Q315 BUFFER
Q307~Q309 DIFFERENTIAL AMP
VR301 B DC BIAS ADJ
Q310 AMP
IC1 (c)
TP4 (B PRE)
B PREVIDEO AMP
Q316,Q317 AMP
TP8 (B OUT)
⑤ B OUT
To MOTHER BOARD---CN3

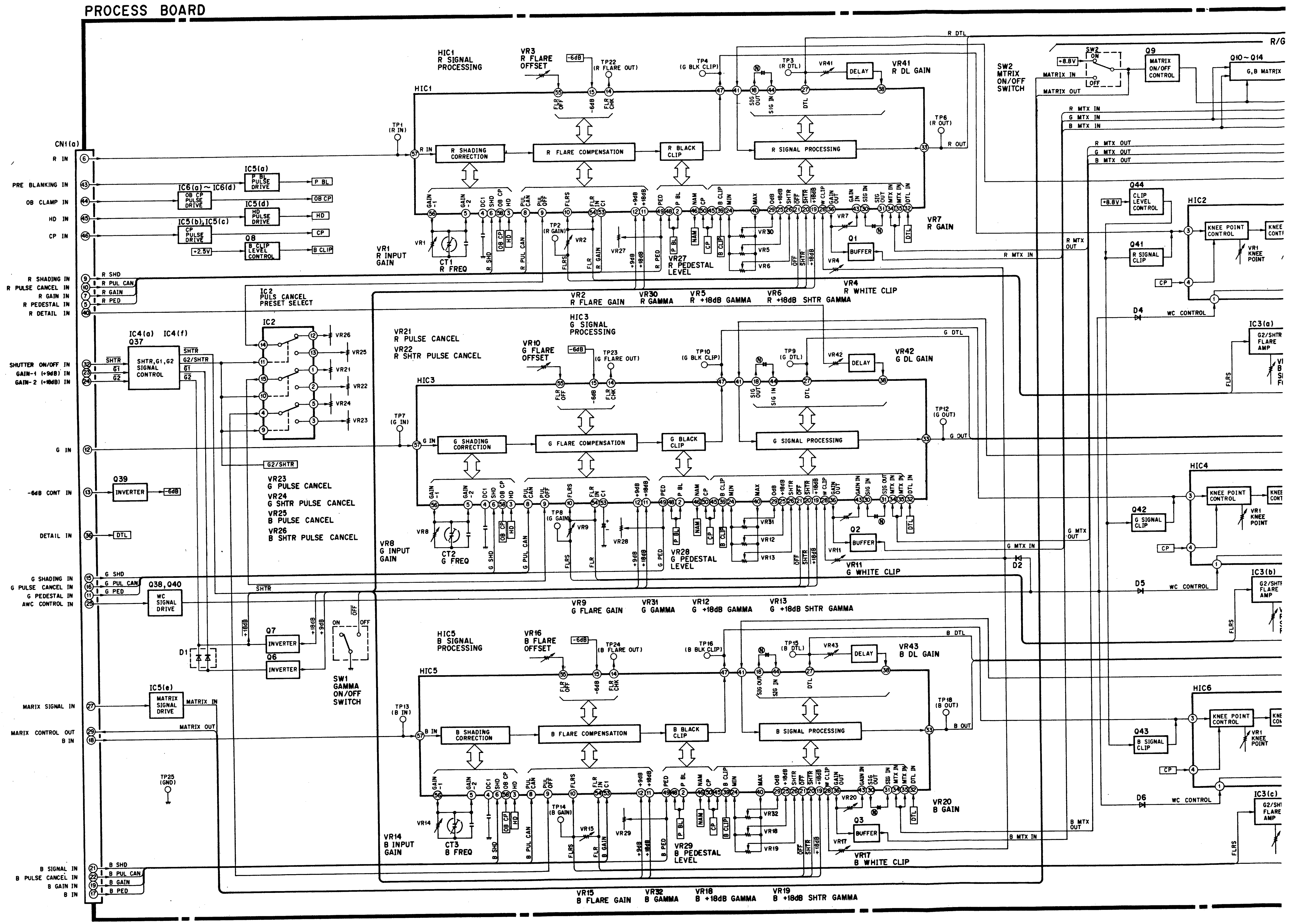
BLOCK DIAGRAM OF POWER/ALC BOARD


POWER/ALC BOARD
CN1(a)
STANDBY CONT IN ㊹
+12V IN ⑦
+12V IN ⑩
HD IN ㊶
+12V IN ㊸
LENS CLOSE IN ㊱
IRIS LEVEL IN ⑱
ALC GATE PULSE IN ㉙
NAM VIDEO IN ㉛
IRIS 1/2 OPEN IN ㊲
IRIS 1/2 CLOSE IN ㊳
IRIS IN ㊴
RCU IRIS REMOTE IN ㊵
TP2 (GND)
TP6 (GND)
TP7 (GND)
IC6(b) Q1~Q3,Q5 STANDBY CONTROL
Q4,Q5 SHORT DETECT
Q8 PROTECT INHIBIT
Q10,Q11 TRIANGLE OSC SYNCHRONIZER
VR1 +5.1V ADJ
VR2 SAW FREQ
TP4 (SAW)
TP5 (SAW FREQ)
Q6,Q7 SHORT DETECT
Q12 SHORT DETECT
Q9 PROTECT INHIBIT
Q14 PROTECT INHIBIT
Q13 SHORT DETECT
IC1 SWITCHING CONTROL
IC2 SWITCHING CONTROL
IC3 SWITCHING CONTROL
+9.2V REGULATOR
Q15,Q16 DRIVE
Q17,Q46,Q49 SWITCHING
IC4(a),Q18,Q19 +9.2V REGULATOR
+15.5V REGULATOR
Q20,Q22 DRIVE
Q21,Q23 SWITCHING
IC4(b),Q24,Q25 +15.5V REGULATOR
+5.1V REGULATOR
Q26,Q27 DRIVE
Q28,Q29 SWITCHING
IC4(c),Q30,Q31 +5.1V REGULATOR
-4.8V REGULATOR
Q32,Q33 DRIVE
Q35 SWITCHING
IC4(d),Q36,Q37 -4.8V REGULATOR
-8.3V REGULATOR
Q38,Q39 DRIVE
Q40 SWITCHING
IC5(a),Q42,Q43 -8.3V REGULATOR
NAM VIDEO
Q401 Q402,Q412 NAM VIDEO AMP
Q420 CLOSE SIGNAL CONTROL
+12V OUT
LENS CLOSE
Q413,Q414 VIDEO LEVEL AMP
Q415,IC403(b) VIDEO LEVEL CONTROL
Q409 NAM VIDEO AMP
IC401 NAM VIDEO LEVEL CONTROL
IC404~IC406 SYNC PULSE CONTROL
HD
ALC GATE
COOLER ON/OFF CONTROL
IC11,IC12,Q47 COOLER CONTROL
Q48 COOLER CONTROL
COOLER(+)
COOLER(-)
SW1 FOR ALC GAIN MEASUREMENT SWITCH
SW2 FOR ALC GAIN ADJUSTMENT SWITCH
Q416,Q417 LENS IRIS 1/2 OPEN 1/2 CLOSE CONTROL
IRIS
Q418,Q419 ALC GAIN CONTROL
IC403(a) LENS IRIS CONTROL
VR403 GAIN
Q403 BIAS CONTROL
VR404 CLOSE
IC402(b)
IC402(b) LENS IRIS CONTROL RCU/CAM SELECT
Q405,Q407 LENS IRIS CLOSE CONTROL
Q408 LENS IRIS OPERATION RCU/CAM SELECT
Q406 LENS IRIS OPERATION RCU/CAM SELECT
IRIS 1/2 OPEN
IC402(a) LENS IRIS 1/2 OPEN SWITCH
RCU IRIS REMOTE
Q404 LENS IRIS CONTROL RCU/CAM SWITCH
IC402(c)
IRIS LEVEL
IRIS 1/2 CLOSE
IC402(c) LENS IRIS 1/2 CLOSE SWITCH
LENS POWER SWITCH
Q410,Q411 LENS POWER CONTROL
TP3 (+9.2V)
CN1(b)
㉝ LENS IRIS A/M CONT OUT
① +9.2V OUT
⑥ +9.2V OUT
㉚ LENS IRIS CONT OUT
⑪ +15.5V OUT
⑫ +15.5V OUT
㉜ IRIS 1/2 CONT OUT
㉟ LENS IRIS A/R CONT OUT
⑪ +15.5V OUT
⑫ +15.5V OUT
⑯ +5.1V OUT
⑰ +5.1V OUT
⑲ +5.1V OUT
⑳ +5.1V OUT
㉖ -4.8V OUT
㉘ -4.8V OUT
㉑ -8.3V OUT
㉓ -8.3V OUT
㉞ +12V OUT
㉔ COOLER(+)
㉕ COOLER(-)

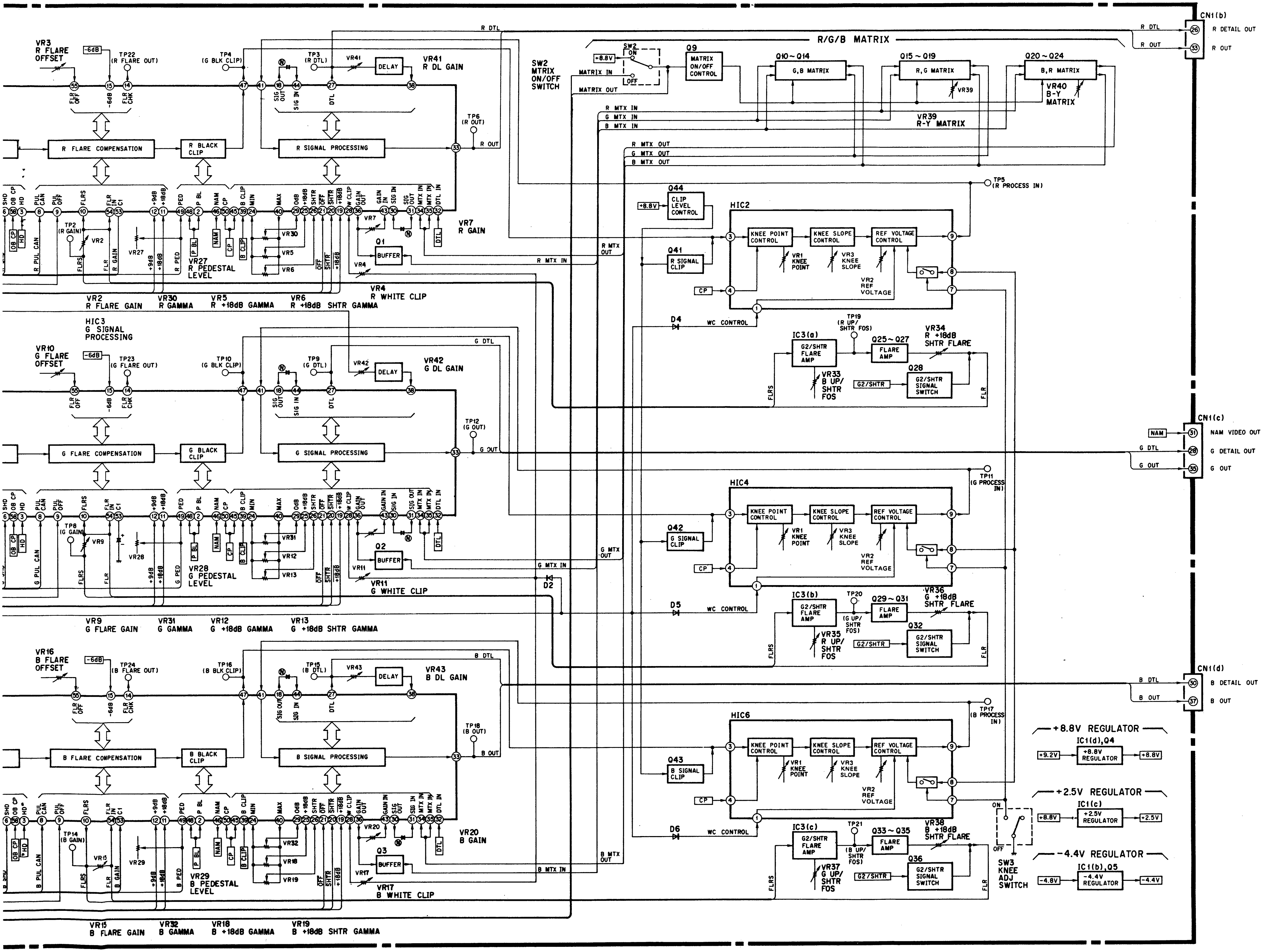
BLOCK DIAGRAM OF DETAIL/SHADING BOARD


DETAIL / SHADING BOARD
CN1(a)
HD IN ㊶
HD
G DETAIL IN ⑰
AWC CONTROL IN ⑲
SHUTTER ON/OFF IN ⑫
GAIN-2(+18dB) IN ⑮
VD IN ㊵
GAIN-1(+9dB) IN ⑪
GAIN-2(+18dB) IN ⑮
GAIN-1(+9dB)
GAIN-2(+18dB)
R DETAIL IN ⑬
DETAIL BANC IN ⑳
B DETAIL IN ㉑
RCU DETAIL ON/OFF IN ㉓
PRE BLANKING IN ㊴
SW1
1H PASS
SWITCH
G DETAIL
PASS
1H
ON
+3V
TP13
(PLL LOCK)
+5V
CT1
PLL
LOCK
IC1(a), IC1(b), IC2, IC3(a)～IC3(d), IC4, IC5(a)～IC5(f), IC13(a)～(d)
PHASE LOCKED LOOP CIRCUIT
CP
+9V REGULATOR
IC8(a), Q22
+9.2V
+9V VOLTAGE REGULATOR
+9V
Q52, Q63
WC SIGNAL CONTROL
IC19
IC19 DARK SHADING CORRECTION SIGNAL GENERATOR
R SHD
G SHD
B SHD
+9.2V
-4.8V
1H DETAIL SIGNAL GENERATOR
IC9(a)
TP1
(CCD IN)
Q4～Q6
AMP
VR3
IC6(a)
H
L
VR3
1H CCD
D RANGE
Q7, Q8, Q10
Q11, Q53, Q54
AMP
Q9
CLAMP
VR4
IC6(c)
VR4
1H SYNC
LEVEL
Q12
AMP
TP2
(1H CCD IN)
IC7
1H CCD DELAY
IC7
1H DELAY
TP3
(1H CCD OUT-1)
Q13～Q15
AMP
Q16
BUFFER
Q17
CLAMP
Q18～Q21
AMP
TP5
(1H OUT)
VR7
IC6(b)
VR7
1H
OUTPUT
GAIN-1
VR8
1H OUTPUT
GAIN-2
VR9
1H CLIP
LEVEL
TP4
(1H CCD OUT-2)
VR6
1H VGG-2
+9V
VR6
VR5
VR5
1H VGG-1
2H DETAIL SIGNAL GENERATOR
IC10
1H DELAY
IC10
TP6
(CCD-2 IN)
TP7
(2H CCD OUT-1)
TP8
(2H CCD OUT-2)
Q23～Q25
AMP
IC9(c)
VR10
VR10
2H CCD
D RANG
Q26～Q28
AMP
Q29
BUFFER
Q30
CLAMP
Q31～Q34
AMP
TP9
(2H OUT)
VR13
IC9(b)
VR14
VR13
2H OUTPUT
GAIN-1
2H OUTPUT
GAIN-2
VR15
2H CLIP
LEVEL
VR12
2H VGG-2
VR12
VR11
VR11
2H VGG-1
CN1(b)
G DETAIL
㉜ G DETAIL OUT
⑩ R SHADING OUT
⑯ G SHADING OUT
㉒ B SHADING OUT
APERTURE GENERATOR
Q35～Q37
OH-Y / 2H-Y MIX
Q38
BUFFER
VR19
TP10
(V APERTURE OUT)
VR20
IC16～IC18, IC20
Q39, Q42, Q55～Q62
H. APERTURE GENERATOR
LEVEL DEPENDENT CONTROL
Q44
HIGH GAIN LEVEL DEPENDENT CONTROL
VR24
Q43, Q45, Q46
LEVEL DEPENDENT CONTROL
VR23
TP14
Q47
DETAIL CONTROL
TP11
(H APERTURE)
IC11, Q48
DETAIL AMP
DETAIL OUTPUT
+9V
VR25
Q49
GAIN-2 NOISE SUPPRESS CONTROL
VR26
Q50
GAIN-1 NOISE SUPPRESS CONTROL
VR27
IC8(b)
+4.5V REGULATOR
IC8(c)
+3V REGULATOR
IC12(a)
GAIN-2 ON/OFF CONTROL
IC12(b)
GAIN-1 ON/OFF CONTROL
GAIN-1(+9dB)
IC12(c)
DETAIL H/L SELECT
+3V
VR28
GAIN(+18dB)
Q51
BUFFER
TP12
(TOTAL APERTURE OUT)
㉖ DETAIL OUT
VR19
V APERTURE
VR20
H APERTURE
HIGH
VR24
GAIN-2
LEVEL DEPENDENT
VR23
LEVEL DEPENDENT
VR25
GAIN-2
NOISE SUPPRESS
VR26
GAIN-1
NOISE SUPPRESS
VR27
NOISE SUPPRESS
VR28
TOTAL APERTURE

BLOCK DIAGRAM OF PROCESS BOARD

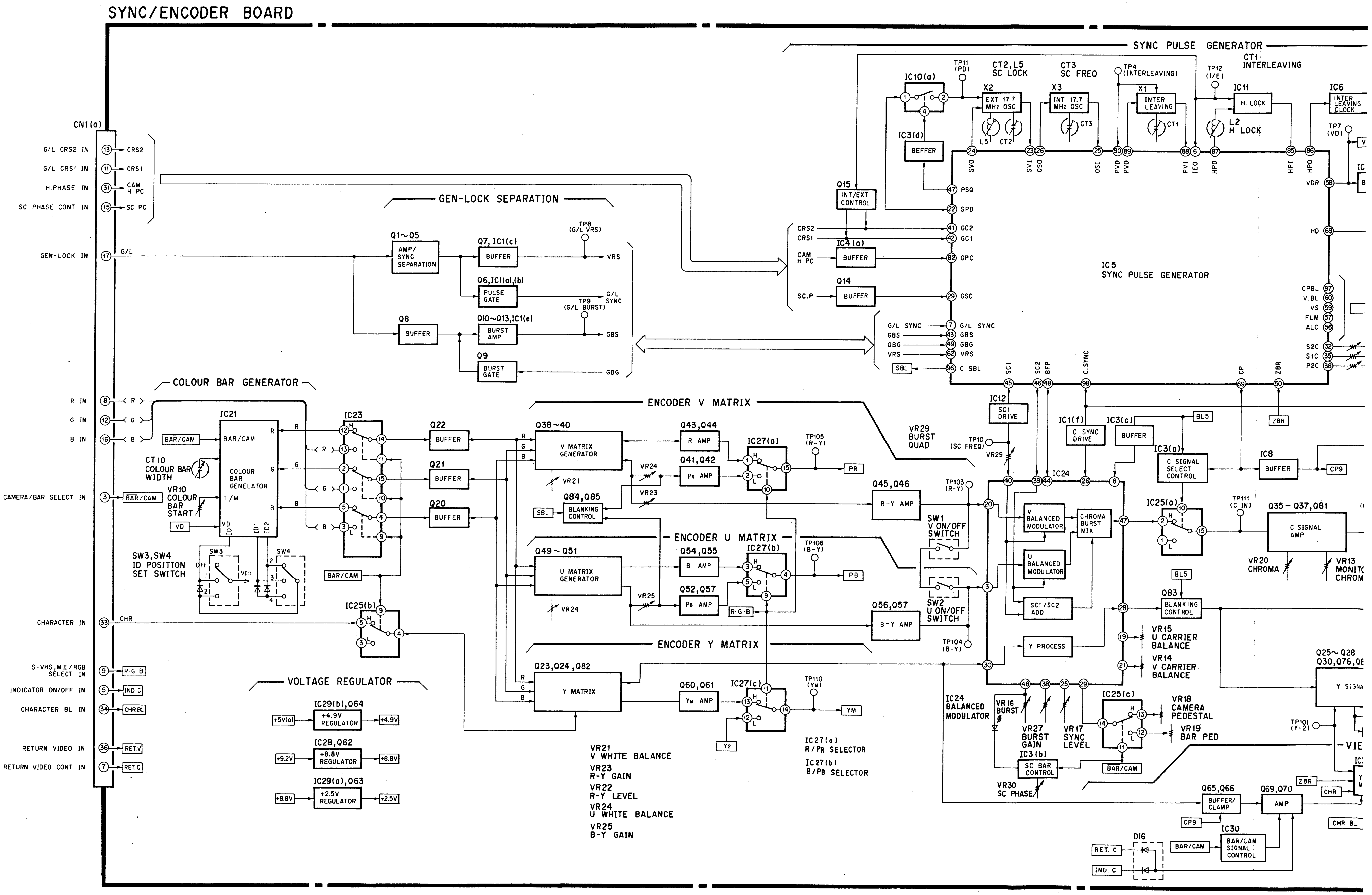

PROCESS BOARD
CN1(a)
R IN
PRE BLANKING IN
OB CLAMP IN
HD IN
CP IN
R SHADING IN
R PULSE CANCEL IN
R GAIN IN
R PEDESTAL IN
R DETAIL IN
SHUTTER ON/OFF IN
GAIN-1 (+9dB) IN
GAIN-2 (+18dB) IN
G IN
-6dB CONT IN
DETAIL IN
G SHADING IN
G PULSE CANCEL IN
G PEDESTAL IN
AWC CONTROL IN
MARIX SIGNAL IN
MARIX CONTROL OUT
B IN
B SIGNAL IN
B PULSE CANCEL IN
B GAIN IN
B IN
IC5(a) P BL PULSE DRIVE
IC6(a)~IC6(d) OB CP PULSE DRIVE
IC5(d) HD PULSE DRIVE
IC5(b),IC5(c) CP PULSE DRIVE
Q8 B CLIP LEVEL CONTROL
+2.5V
P BL
OB CP
HD
CP
B CLIP
IC4(a) IC4(f) Q37 SHTR,G1,G2 SIGNAL CONTROL
IC2 PULS CANCEL PRESET SELECT
IC2
VR26
VR25
VR21
VR22
VR24
VR23
G2/SHTR
VR23 G PULSE CANCEL
VR24 G SHTR PULSE CANCEL
VR25 B PULSE CANCEL
VR26 B SHTR PULSE CANCEL
Q39 INVERTER
-6dB
DTL
Q38,Q40 WC SIGNAL DRIVE
Q7 INVERTER
Q6 INVERTER
D1
SW1 GAMMA ON/OFF SWITCH
IC5(e) MATRIX SIGNAL DRIVE
MATRIX IN
MATRIX OUT
TP25 (GND)
HIC1 R SIGNAL PROCESSING
HIC1
VR3 R FLARE OFFSET
TP22 (R FLARE OUT)
TP4 (G BLK CLIP)
TP3 (R DTL)
VR41
DELAY
VR41 R DL GAIN
TP1 (R IN)
R SHADING CORRECTION
R FLARE COMPENSATION
R BLACK CLIP
R SIGNAL PROCESSING
TP6 (R OUT)
R OUT
TP2 (R GAIN)
VR1 R INPUT GAIN
CT1 R FREQ
VR2
VR27
VR27 R PEDESTAL LEVEL
VR30
VR5
VR6
VR7 R GAIN
Q1 BUFFER
VR4 R WHITE CLIP
VR2 R FLARE GAIN
VR30 R GAMMA
VR5 R +18dB GAMMA
VR6 R +18dB SHTR GAMMA
VR21 R PULSE CANCEL
VR22 R SHTR PULSE CANCEL
HIC3 G SIGNAL PROCESSING
HIC3
VR10 G FLARE OFFSET
TP23 (G FLARE OUT)
TP10 (G BLK CLIP)
TP9 (G DTL)
VR42
VR42 G DL GAIN
TP7 (G IN)
G SHADING CORRECTION
G FLARE COMPENSATION
G BLACK CLIP
G SIGNAL PROCESSING
TP12 (G OUT)
G OUT
TP8 (G GAIN)
VR8 G INPUT GAIN
CT2 G FREQ
VR9
VR28
VR28 G PEDESTAL LEVEL
VR31
VR12
VR13
Q2 BUFFER
VR11 G WHITE CLIP
D2
VR9 G FLARE GAIN
VR31 G GAMMA
VR12 G +18dB GAMMA
VR13 G +18dB SHTR GAMMA
HIC5 B SIGNAL PROCESSING
HIC5
VR16 B FLARE OFFSET
TP24 (B FLARE OUT)
TP16 (B BLK CLIP)
TP15 (B DTL)
VR43
VR43 B DL GAIN
TP13 (B IN)
B SHADING CORRECTION
B FLARE COMPENSATION
B BLACK CLIP
B SIGNAL PROCESSING
TP18 (B OUT)
B OUT
TP14 (B GAIN)
VR14 B INPUT GAIN
CT3 B FREQ
VR15
VR29
VR29 B PEDESTAL LEVEL
VR32
VR18
VR19
VR20 B GAIN
Q3 BUFFER
VR17 B WHITE CLIP
VR15 B FLARE GAIN
VR32 B GAMMA
VR18 B +18dB GAMMA
VR19 B +18dB SHTR GAMMA
R DTL
G DTL
B DTL
SW2 MTRIX ON/OFF SWITCH
+8.8V
ON
OFF
MATRIX IN
MATRIX OUT
Q9 MATRIX ON/OFF CONTROL
Q10~Q14 G,B MATRIX
R/G
R MTX IN
G MTX IN
B MTX IN
R MTX OUT
G MTX OUT
B MTX OUT
Q44 CLIP LEVEL CONTROL
HIC2
KNEE POINT CONTROL
VR1 KNEE POINT
Q41 R SIGNAL CLIP
R MTX OUT
G MTX OUT
B MTX OUT
D4
D5
D6
WC CONTROL
IC3(a) G2/SHTR FLARE AMP
IC3(b) G2/SHTR FLARE AMP
IC3(c) G2/SHTR FLARE AMP
HIC4
Q42 G SIGNAL CLIP
HIC6
Q43 B SIGNAL CLIP
FLRS

BLOCK DIAGRAM OF PROCESS BOARD

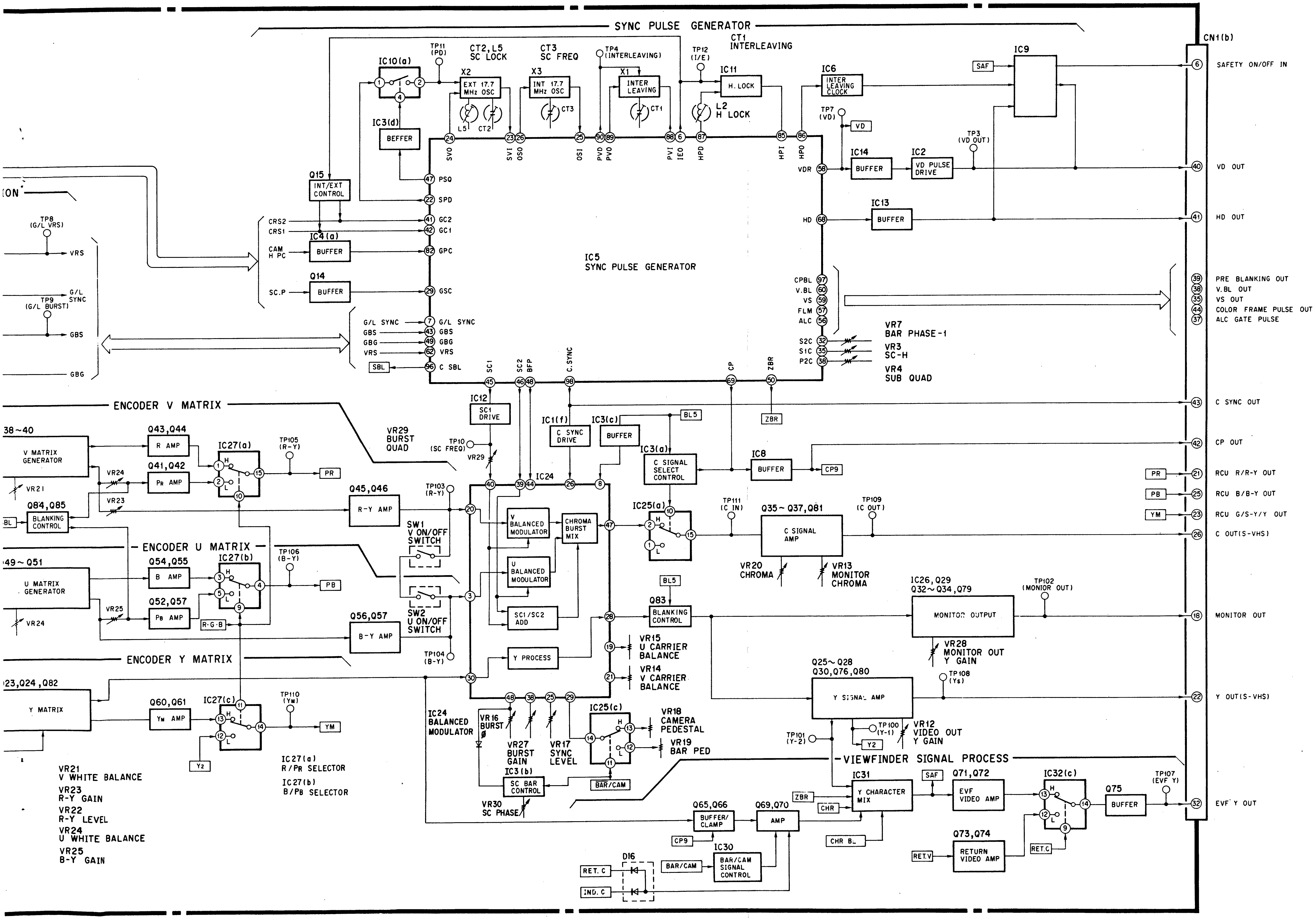


VR3 R FLARE OFFSET
TP22 (R FLARE OUT)
TP4 (G BLK CLIP)
TP3 (R DTL)
VR41 R DL GAIN
DELAY
R DTL
R FLARE COMPENSATION
R BLACK CLIP
R SIGNAL PROCESSING
TP6 (R OUT)
R OUT
TP2 (R GAIN)
VR7 R GAIN
Q1 BUFFER
VR2 R FLARE GAIN
VR30 R GAMMA
VR5 R +18dB GAMMA
VR6 R +18dB SHTR GAMMA
VR27 R PEDESTAL LEVEL
VR4 R WHITE CLIP
R MTX IN
SW2 MTRIX ON/OFF SWITCH
MATRIX IN
MATRIX OUT
+8.8V
Q9 MATRIX ON/OFF CONTROL
R/G/B MATRIX
Q10~Q14 G,B MATRIX
Q15~Q19 R,G MATRIX
Q20~Q24 B,R MATRIX
VR39 R-Y MATRIX
VR40 B-Y MATRIX
R MTX IN
G MTX IN
B MTX IN
R MTX OUT
G MTX OUT
B MTX OUT
CN1(b)
R DETAIL OUT
R OUT
TP5 (R PROCESS IN)
Q44 CLIP LEVEL CONTROL
Q41 R SIGNAL CLIP
HIC2
KNEE POINT CONTROL
KNEE SLOPE CONTROL
REF VOLTAGE CONTROL
VR1 KNEE POINT
VR3 KNEE SLOPE
VR2 REF VOLTAGE
CP
D4
WC CONTROL
TP19 (R UP/ SHTR FOS)
IC3(a) G2/SHTR FLARE AMP
Q25~Q27 FLARE AMP
VR34 R +18dB SHTR FLARE
VR33 B UP/ SHTR FOS
G2/SHTR
Q28 G2/SHTR SIGNAL SWITCH
HIC3 G SIGNAL PROCESSING
VR10 G FLARE OFFSET
TP23 (G FLARE OUT)
TP10 (G BLK CLIP)
TP9 (G DTL)
VR42 G DL GAIN
G DTL
G FLARE COMPENSATION
G BLACK CLIP
G SIGNAL PROCESSING
TP12 (G OUT)
G OUT
TP8 (G GAIN)
Q2 BUFFER
VR9 G FLARE GAIN
VR31 G GAMMA
VR12 G +18dB GAMMA
VR13 G +18dB SHTR GAMMA
VR28 G PEDESTAL LEVEL
VR11 G WHITE CLIP
G MTX IN
G MTX OUT
D2
CN1(c)
NAM VIDEO OUT
G DETAIL OUT
G OUT
TP11 (G PROCESS IN)
HIC4
Q42 G SIGNAL CLIP
D5
IC3(b)
TP20 (G UP/ SHTR FOS)
Q29~Q31 FLARE AMP
VR36 G +18dB SHTR FLARE
VR35 R UP/ SHTR FOS
Q32 G2/SHTR SIGNAL SWITCH
VR16 B FLARE OFFSET
TP24 (B FLARE OUT)
TP16 (B BLK CLIP)
TP15 (B DTL)
VR43 B DL GAIN
B DTL
B FLARE COMPENSATION
B BLACK CLIP
B SIGNAL PROCESSING
TP18 (B OUT)
B OUT
TP14 (B GAIN)
VR20 B GAIN
Q3 BUFFER
VR15 B FLARE GAIN
VR32 B GAMMA
VR18 B +18dB GAMMA
VR19 B +18dB SHTR GAMMA
VR29 B PEDESTAL LEVEL
VR17 B WHITE CLIP
B MTX IN
B MTX OUT
CN1(d)
B DETAIL OUT
B OUT
TP17 (B PROCESS IN)
HIC6
Q43 B SIGNAL CLIP
D6
IC3(c)
TP21 (B UP/ SHTR FOS)
Q33~Q35 FLARE AMP
VR38 B +18dB SHTR FLARE
VR37 G UP/ SHTR FOS
Q36 G2/SHTR SIGNAL SWITCH
SW3 KNEE ADJ SWITCH
ON
OFF
+8.8V REGULATOR
IC1(d),Q4
+9.2V
+8.8V REGULATOR
+8.8V
+2.5V REGULATOR
IC1(c)
+2.5V REGULATOR
+2.5V
-4.4V REGULATOR
IC1(b),Q5
-4.8V
-4.4V REGULATOR
-4.4V

BLOCK DIAGRAM OF SYNC/ENCODER BOARD


SYNC/ENCODER BOARD
CN1(a)
G/L CRS2 IN
G/L CRS1 IN
H.PHASE IN
SC PHASE CONT IN
GEN-LOCK IN
R IN
G IN
B IN
CAMERA/BAR SELECT IN
CHARACTER IN
S-VHS,MII/RGB SELECT IN
INDICATOR ON/OFF IN
CHARACTER BL IN
RETURN VIDEO IN
RETURN VIDEO CONT IN
CRS2
CRS1
CAM H PC
SC PC
G/L
CHR
R·G·B
IND.C
CHR BL
RET.V
RET.C
SYNC PULSE GENERATOR
GEN-LOCK SEPARATION
Q1~Q5
AMP/SYNC SEPARATION
Q7, IC1(c)
BUFFER
TP8 (G/L VRS)
VRS
Q6,IC1(a),(b)
PULSE GATE
G/L SYNC
TP9 (G/L BURST)
Q8
BUFFER
Q10~Q13,IC1(e)
BURST AMP
GBS
Q9
BURST GATE
GBG
IC10(a)
TP11 (PD)
CT2,L5 SC LOCK
CT3 SC FREQ
TP4 (INTERLEAVING)
TP12 (I/E)
CT1 INTERLEAVING
X2
EXT 17.7 MHz OSC
X3
INT 17.7 MHz OSC
X1
INTER LEAVING
IC11
H.LOCK
IC6
INTER LEAVING CLOCK
TP7 (VD)
L5
CT2
CT3
CT1
L2 H LOCK
IC3(d)
BEFFER
Q15
INT/EXT CONTROL
IC4(a)
BUFFER
Q14
BUFFER
CRS2
CRS1
CAM H PC
SC.P
G/L SYNC
GBS
GBG
VRS
SBL
PSQ
SPD
GC2
GC1
GPC
GSC
C SBL
SVO
SVI
OSO
OSI
PVD
PVO
PVI
IEO
HPD
HPI
HPO
VDR
HD
IC5
SYNC PULSE GENERATOR
CPBL
V.BL
VS
FLM
ALC
S2C
S1C
P2C
SC1
SC2
BFP
C.SYNC
CP
ZBR
COLOUR BAR GENERATOR
IC21
BAR/CAM
COLOUR BAR GENELATOR
T/M
VD
ID1
ID2
CT10 COLOUR BAR WIDTH
VR10 COLOUR BAR START
SW3,SW4 ID POSITION SET SWITCH
SW3
SW4
OFF
IC23
Q22
BUFFER
Q21
BUFFER
Q20
BUFFER
BAR/CAM
IC25(b)
ENCODER V MATRIX
Q38~40
V MATRIX GENERATOR
VR21
Q43,Q44
R AMP
Q41,Q42
PB AMP
VR24
VR23
IC27(a)
TP105 (R-Y)
PR
Q84,Q85
BLANKING CONTROL
SBL
ENCODER U MATRIX
Q49~Q51
U MATRIX GENERATOR
VR24
Q54,Q55
B AMP
Q52,Q57
PB AMP
VR25
IC27(b)
TP106 (B-Y)
PB
R·G·B
ENCODER Y MATRIX
Q23,Q24,Q82
Y MATRIX
Q60,Q61
YM AMP
IC27(c)
TP110 (YM)
YM
Y2
VR29 BURST QUAD
TP10 (SC FREQ)
VR29
Q45,Q46
R-Y AMP
TP103 (R-Y)
SW1 V ON/OFF SWITCH
SW2 U ON/OFF SWITCH
Q56,Q57
B-Y AMP
TP104 (B-Y)
IC12
SC1 DRIVE
IC1(f)
C SYNC DRIVE
IC3(c)
BUFFER
BL5
ZBR
IC3(a)
C SIGNAL SELECT CONTROL
IC8
BUFFER
CP9
IC24
V BALANCED MODULATOR
CHROMA BURST MIX
U BALANCED MODULATOR
SC1/SC2 ADD
Y PROCESS
IC25(a)
TP111 (C IN)
Q35~Q37,Q81
C SIGNAL AMP
VR20 CHROMA
VR13 MONITO CHROM
BL5
Q83
BLANKING CONTROL
VR15 U CARRIER BALANCE
VR14 V CARRIER BALANCE
IC24 BALANCED MODULATOR
VR16 BURST Ø
VR27 BURST GAIN
VR17 SYNC LEVEL
IC3(b)
SC BAR CONTROL
VR30 SC PHASE
IC25(c)
VR18 CAMERA PEDESTAL
VR19 BAR PED
BAR/CAM
Q25~Q28 Q30,Q76,Q8
Y SIGNA
TP101 (Y-2)
VIE
IC
Q65,Q66
BUFFER/CLAMP
Q69,Q70
AMP
ZBR
CHR
CHR B
CP9
IC30
BAR/CAM SIGNAL CONTROL
BAR/CAM
D16
RET. C
IND. C
VOLTAGE REGULATOR
IC29(b),Q64
+5V(a)
+4.9V REGULATOR
+4.9V
IC28,Q62
+9.2V
+8.8V REGULATOR
+8.8V
IC29(a),Q63
+8.8V
+2.5V REGULATOR
+2.5V
VR21 V WHITE BALANCE
VR23 R-Y GAIN
VR22 R-Y LEVEL
VR24 U WHITE BALANCE
VR25 B-Y GAIN
IC27(a) R/PR SELECTOR
IC27(b) B/PB SELECTOR

BLOCK DIAGRAM OF SYNC/ENCODER BOARD

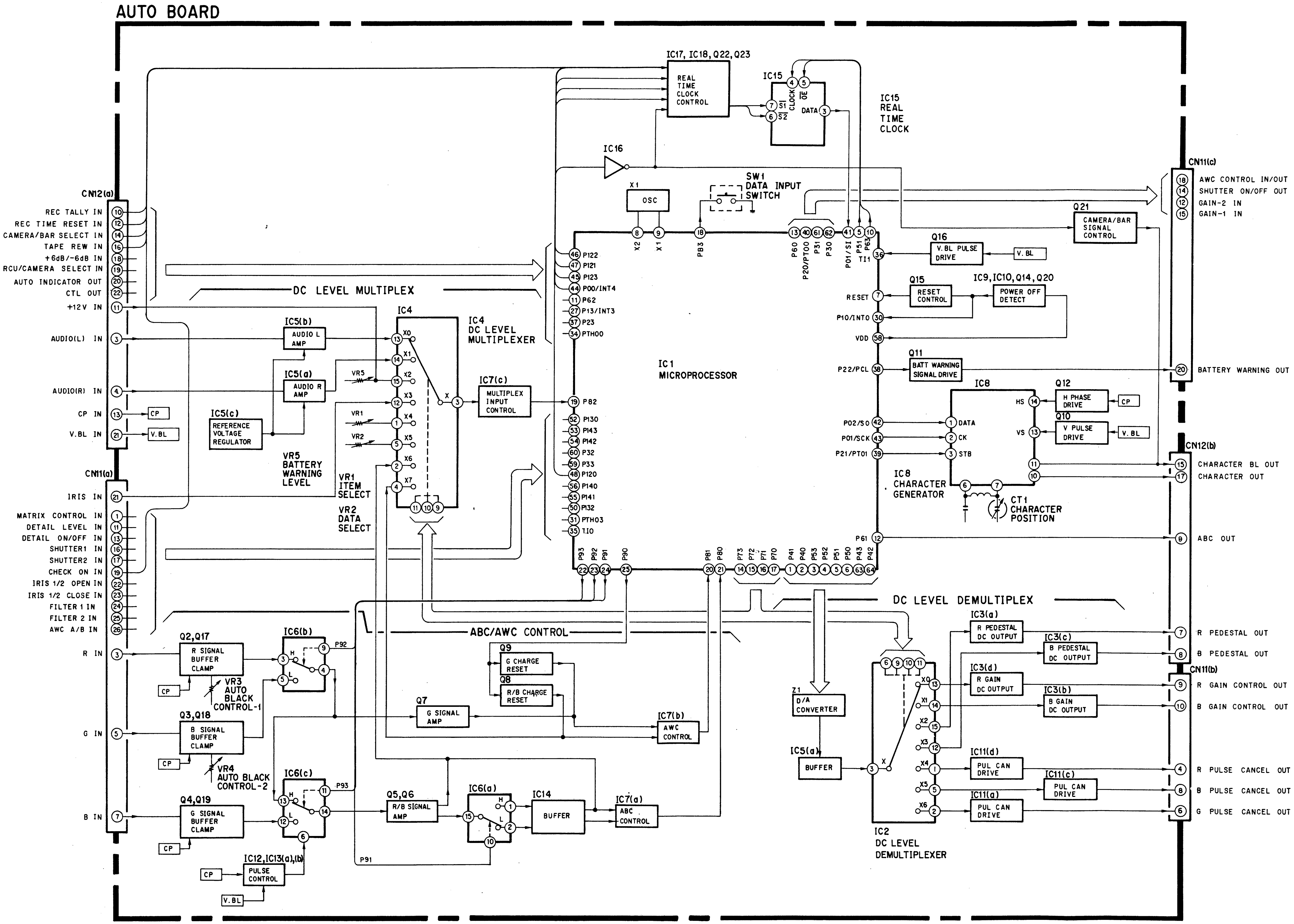


SYNC PULSE GENERATOR
IC10(a)
IC3(d)
BEFFER
TP11 (PD)
CT2, L5 SC LOCK
X2
EXT 17.7 MHz OSC
L5
CT2
CT3 SC FREQ
X3
INT 17.7 MHz OSC
CT3
TP4 (INTERLEAVING)
X1
INTER LEAVING
CT1
TP12 (I/E)
CT1 INTERLEAVING
IC11
H. LOCK
L2 H LOCK
IC6
INTER LEAVING CLOCK
IC9
SAF
TP7 (VD)
VD
IC14
BUFFER
IC2
VD PULSE DRIVE
TP3 (VD OUT)
IC13
BUFFER
Q15
INT/EXT CONTROL
ION
TP8 (G/L VRS)
VRS
G/L SYNC
TP9 (G/L BURST)
GBS
GBG
CRS2
CRS1
IC4(a)
CAM H PC
BUFFER
Q14
SC.P
BUFFER
IC5 SYNC PULSE GENERATOR
PSO
SPD
GC2
GC1
GPC
GSC
G/L SYNC
GBS
GBG
VRS
SBL
C SBL
SVO
SVI
OSO
OSI
PVD
PVO
PVI
IEO
HPD
HPI
HPO
VDR
HD
CPBL
V.BL
VS
FLM
ALC
S2C
S1C
P2C
SC1
SC2
BFP
C.SYNC
CP
ZBR
VR7 BAR PHASE-1
VR3 SC-H
VR4 SUB QUAD
CN1(b)
SAFETY ON/OFF IN
VD OUT
HD OUT
PRE BLANKING OUT
V.BL OUT
VS OUT
COLOR FRAME PULSE OUT
ALC GATE PULSE
C SYNC OUT
CP OUT
RCU R/R-Y OUT
RCU B/B-Y OUT
RCU G/S-Y/Y OUT
C OUT(S-VHS)
MONITOR OUT
Y OUT(S-VHS)
EVF Y OUT
ENCODER V MATRIX
38~40
V MATRIX GENERATOR
VR21
Q84, Q85
BL
BLANKING CONTROL
VR24
VR23
Q43, Q44
R AMP
Q41, Q42
PR AMP
IC27(a)
TP105 (R-Y)
PR
Q45, Q46
R-Y AMP
VR29 BURST QUAD
TP10 (SC FREQ)
VR29
TP103 (R-Y)
IC12
SC1 DRIVE
IC1(f)
C SYNC DRIVE
IC3(c)
BUFFER
BL5
ZBR
IC3(a)
C SIGNAL SELECT CONTROL
IC8
BUFFER
CP9
IC24
V BALANCED MODULATOR
CHROMA BURST MIX
U BALANCED MODULATOR
SC1/SC2 ADD
Y PROCESS
IC25(a)
TP111 (C IN)
Q35~Q37, Q81
C SIGNAL AMP
TP109 (C OUT)
VR20 CHROMA
VR13 MONITOR CHROMA
- ENCODER U MATRIX -
49~Q51
U MATRIX GENERATOR
VR25
VR24
Q54, Q55
B AMP
Q52, Q57
PB AMP
R·G·B
IC27(b)
TP106 (B-Y)
PB
SW1 V ON/OFF SWITCH
SW2 U ON/OFF SWITCH
Q56, Q57
B-Y AMP
TP104 (B-Y)
BL5
Q83
BLANKING CONTROL
VR15 U CARRIER BALANCE
VR14 V CARRIER BALANCE
IC26, Q29 Q32~Q34, Q79
MONITOR OUTPUT
TP102 (MONITOR OUT)
VR28 MONITOR OUT Y GAIN
TP108 (Ys)
ENCODER Y MATRIX
23, Q24, Q82
Y MATRIX
Q60, Q61
YM AMP
IC27(c)
TP110 (YM)
YM
Y2
IC24 BALANCED MODULATOR
VR16 BURST Ø
VR27 BURST GAIN
VR17 SYNC LEVEL
IC25(c)
VR18 CAMERA PEDESTAL
VR19 BAR PED
IC3(b)
SC BAR CONTROL
BAR/CAM
VR30 SC PHASE
Q25~Q28 Q30, Q76, Q80
Y SIGNAL AMP
TP100 (Y-1)
VR12 VIDEO OUT Y GAIN
TP101 (Y-2)
Y2
VIEWFINDER SIGNAL PROCESS
IC31
Y CHARACTER MIX
SAF
ZBR
CHR
CHR B
Q71, Q72
EVF VIDEO AMP
IC32(c)
Q75
BUFFER
TP107 (EVF Y)
Q65, Q66
BUFFER/CLAMP
CP9
Q69, Q70
AMP
IC30
BAR/CAM SIGNAL CONTROL
BAR/CAM
D16
RET. C
IND. C
Q73, Q74
RETURN VIDEO AMP
RET.V
RET.C

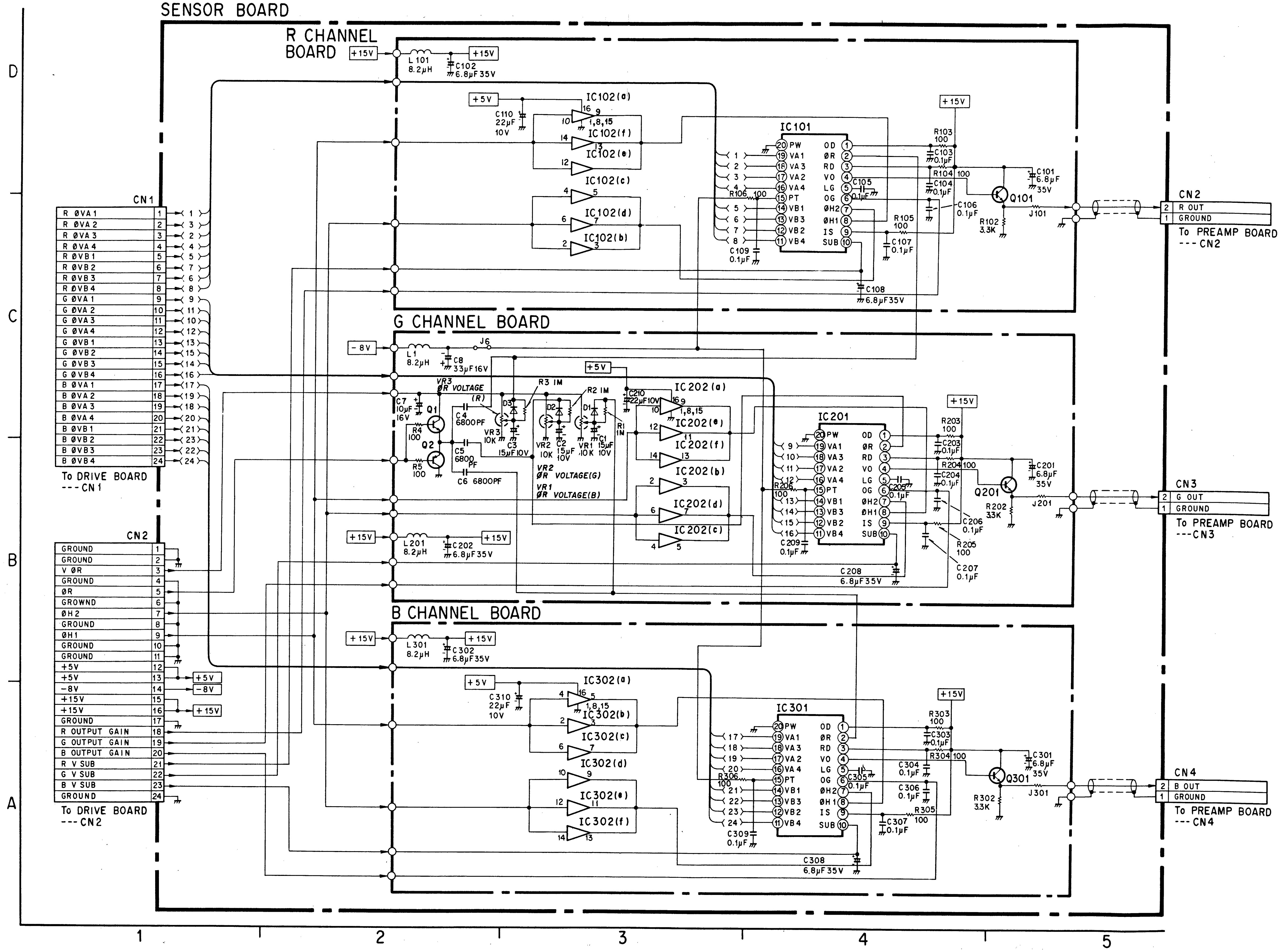
VR21 V WHITE BALANCE
VR23 R-Y GAIN
VR22 R-Y LEVEL
VR24 U WHITE BALANCE
VR25 B-Y GAIN

IC27(a) R/PR SELECTOR
IC27(b) B/PB SELECTOR

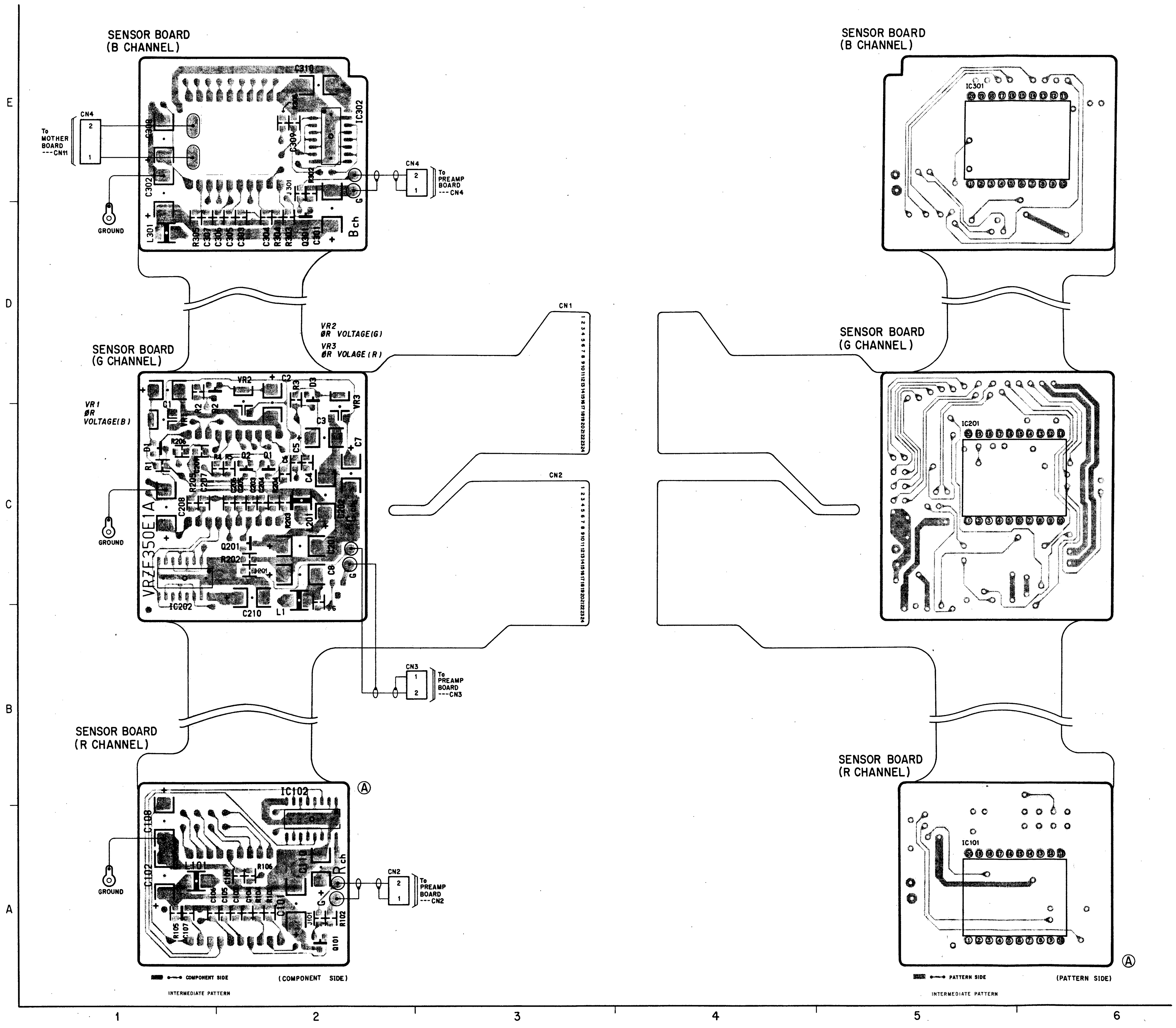
BLOCK DIAGRAM OF AUTO BOARD


AUTO BOARD
IC17, IC18, Q22, Q23
REAL TIME CLOCK CONTROL
IC15
CLOCK
OE
S1
S2
DATA
IC15 REAL TIME CLOCK
IC16
X1
OSC
SW1 DATA INPUT SWITCH
X2
P83
P60
P20/PTO0
P31
P30
P01/SI
P51
P63
TI1
CN11(c)
AWC CONTROL IN/OUT
SHUTTER ON/OFF OUT
GAIN-2 IN
GAIN-1 IN
Q21
CAMERA/BAR SIGNAL CONTROL
Q16
V.BL PULSE DRIVE
V.BL
CN12(a)
REC TALLY IN
REC TIME RESET IN
CAMERA/BAR SELECT IN
TAPE REW IN
+6dB/-6dB IN
RCU/CAMERA SELECT IN
AUTO INDICATOR OUT
CTL OUT
+12V IN
AUDIO(L) IN
AUDIO(R) IN
CP IN
V.BL IN
CN11(a)
IRIS IN
MATRIX CONTROL IN
DETAIL LEVEL IN
DETAIL ON/OFF IN
SHUTTER1 IN
SHUTTER2 IN
CHECK ON IN
IRIS 1/2 OPEN IN
IRIS 1/2 CLOSE IN
FILTER 1 IN
FILTER 2 IN
AWC A/B IN
R IN
G IN
B IN
DC LEVEL MULTIPLEX
IC4
IC4 DC LEVEL MULTIPLEXER
IC5(b)
AUDIO L AMP
IC5(a)
AUDIO R AMP
IC5(c)
REFERENCE VOLTAGE REGULATOR
VR5
VR1
VR2
VR5 BATTERY WARNING LEVEL
VR1 ITEM SELECT
VR2 DATA SELECT
IC7(c)
MULTIPLEX INPUT CONTROL
P122
P121
P123
P00/INT4
P62
P13/INT3
P23
PTHO0
P82
P130
P143
P142
P32
P33
P120
P140
P141
P132
PTHO3
TI0
IC1 MICROPROCESSOR
Q15
RESET CONTROL
IC9, IC10, Q14, Q20
POWER OFF DETECT
RESET
P10/INT0
VDD
Q11
BATT WARNING SIGNAL DRIVE
P22/PCL
BATTERY WARNING OUT
IC8
Q12
H PHASE DRIVE
CP
Q10
V PULSE DRIVE
HS
VS
P02/SO
P01/SCK
P21/PTO1
DATA
CK
STB
IC8 CHARACTER GENERATOR
CT1 CHARACTER POSITION
CN12(b)
CHARACTER BL OUT
CHARACTER OUT
P61
ABC OUT
P93
P92
P91
P90
P81
P80
P73
P72
P71
P70
P41
P40
P53
P52
P51
P50
P43
P42
DC LEVEL DEMULTIPLEX
ABC/AWC CONTROL
Q2, Q17
R SIGNAL BUFFER CLAMP
VR3 AUTO BLACK CONTROL-1
Q3, Q18
B SIGNAL BUFFER CLAMP
VR4 AUTO BLACK CONTROL-2
Q4, Q19
G SIGNAL BUFFER CLAMP
IC6(b)
IC6(c)
IC12, IC13(a),(b)
PULSE CONTROL
Q9
G CHARGE RESET
Q8
R/B CHARGE RESET
Q7
G SIGNAL AMP
IC7(b)
AWC CONTROL
Q5, Q6
R/B SIGNAL AMP
IC6(a)
IC14
BUFFER
IC7(a)
ABC CONTROL
Z1
D/A CONVERTER
IC5(a)
BUFFER
IC2 DC LEVEL DEMULTIPLEXER
IC3(a)
R PEDESTAL DC OUTPUT
IC3(c)
B PEDESTAL DC OUTPUT
IC3(d)
R GAIN DC OUTPUT
IC3(b)
B GAIN DC OUTPUT
IC11(d)
PUL CAN DRIVE
IC11(c)
PUL CAN DRIVE
IC11(a)
PUL CAN DRIVE
R PEDESTAL OUT
B PEDESTAL OUT
CN11(b)
R GAIN CONTROL OUT
B GAIN CONTROL OUT
R PULSE CANCEL OUT
B PULSE CANCEL OUT
G PULSE CANCEL OUT

SCHEMATIC DIAGRAM OF SENSOR BOARD

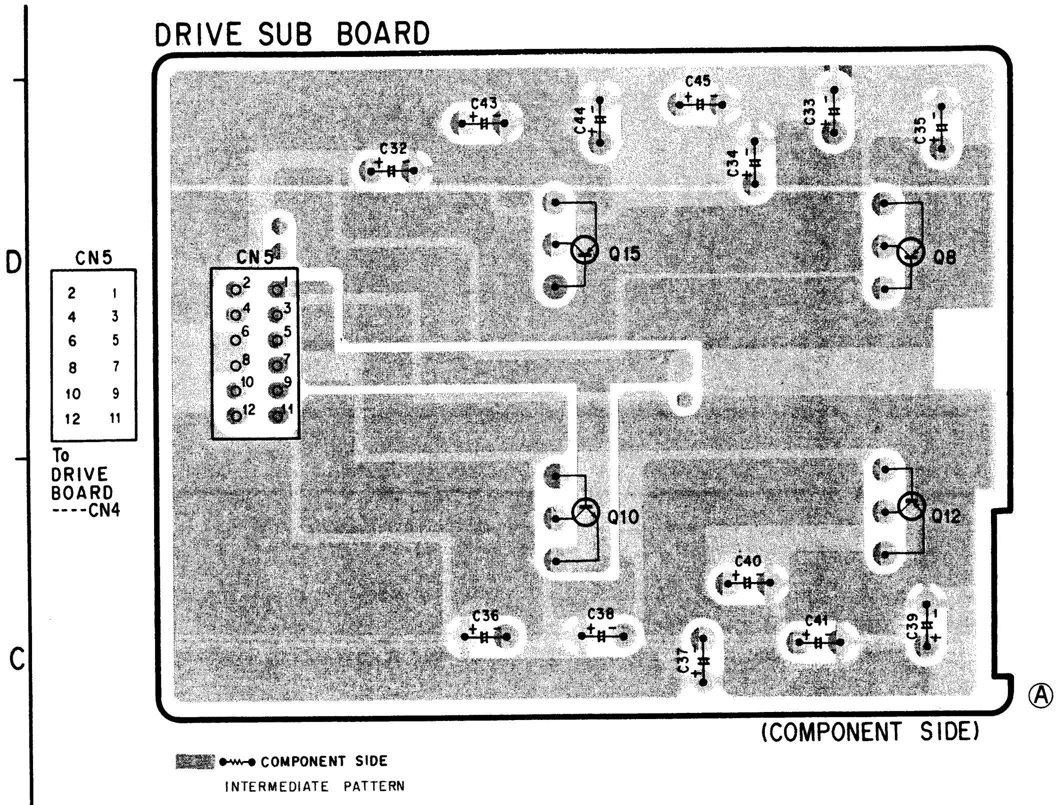

SENSOR BOARD
R CHANNEL BOARD
G CHANNEL BOARD
B CHANNEL BOARD
D
C
B
A
1
2
3
4
5
CN1
R ØVA1
R ØVA2
R ØVA3
R ØVA4
R ØVB1
R ØVB2
R ØVB3
R ØVB4
G ØVA1
G ØVA2
G ØVA3
G ØVA4
G ØVB1
G ØVB2
G ØVB3
G ØVB4
B ØVA1
B ØVA2
B ØVA3
B ØVA4
B ØVB1
B ØVB2
B ØVB3
B ØVB4
To DRIVE BOARD ---CN1
CN2
GROUND
GROUND
V ØR
GROUND
ØR
GROWND
ØH2
GROUND
ØH1
GROUND
GROUND
+5V
+5V
-8V
+15V
+15V
GROUND
R OUTPUT GAIN
G OUTPUT GAIN
B OUTPUT GAIN
R V SUB
G V SUB
B V SUB
GROUND
To DRIVE BOARD ---CN2
+15V
+5V
-8V
L101 8.2μH
C102 6.8μF 35V
IC102(a)
IC102(b)
IC102(c)
IC102(d)
IC102(e)
IC102(f)
C110 22μF 10V
IC101
PW
VA1
VA3
VA2
VA4
PT
VB1
VB3
VB2
VB4
OD
ØR
RD
VO
LG
OG
ØH2
ØH1
IS
SUB
R106 100
C109 0.1μF
C105
R103 100
C103 0.1μF
R104 100
C104 0.1μF
C106 0.1μF
R105 100
C107 0.1μF
C108 6.8μF 35V
C101 6.8μF 35V
Q101
R102 3.3K
J101
CN2
R OUT
GROUND
To PREAMP BOARD ---CN2
L1 8.2μH
J6
C8 33μF 16V
VR3 ØR VOLTAGE (R)
C7 10μF 16V
Q1
Q2
R4 100
R5 100
C4 6800PF
C5 6800PF
C6 6800PF
R3 1M
R2 1M
R1 1M
D1
D2
D3
VR3 10K
VR2 10K
VR1 10K
C3 15μF 10V
C2 15μF 10V
C1 15μF 10V
VR2 ØR VOLTAGE(G)
VR1 ØR VOLTAGE(B)
C210 22μF 10V
IC202(a)
IC202(b)
IC202(c)
IC202(d)
IC202(e)
IC202(f)
IC201
R206 100
C209 0.1μF
R203 100
C203 0.1μF
R204 100
C204 0.1μF
C205 0.1μF
C206 0.1μF
R205 100
C207 0.1μF
C208 6.8μF 35V
C201 6.8μF 35V
Q201
R202 33K
J201
CN3
G OUT
GROUND
To PREAMP BOARD ---CN3
L201 8.2μH
C202 6.8μF 35V
L301 8.2μH
C302 6.8μF 35V
C310 22μF 10V
IC302(a)
IC302(b)
IC302(c)
IC302(d)
IC302(e)
IC302(f)
IC301
R306 100
C309 0.1μF
R303 100
C303 0.1μF
R304 100
C304 0.1μF
C305 0.1μF
C306 0.1μF
R305 100
C307 0.1μF
C308 6.8μF 35V
C301 6.8μF 35V
Q301
R302 33K
J301
CN4
B OUT
GROUND
To PREAMP BOARD ---CN4

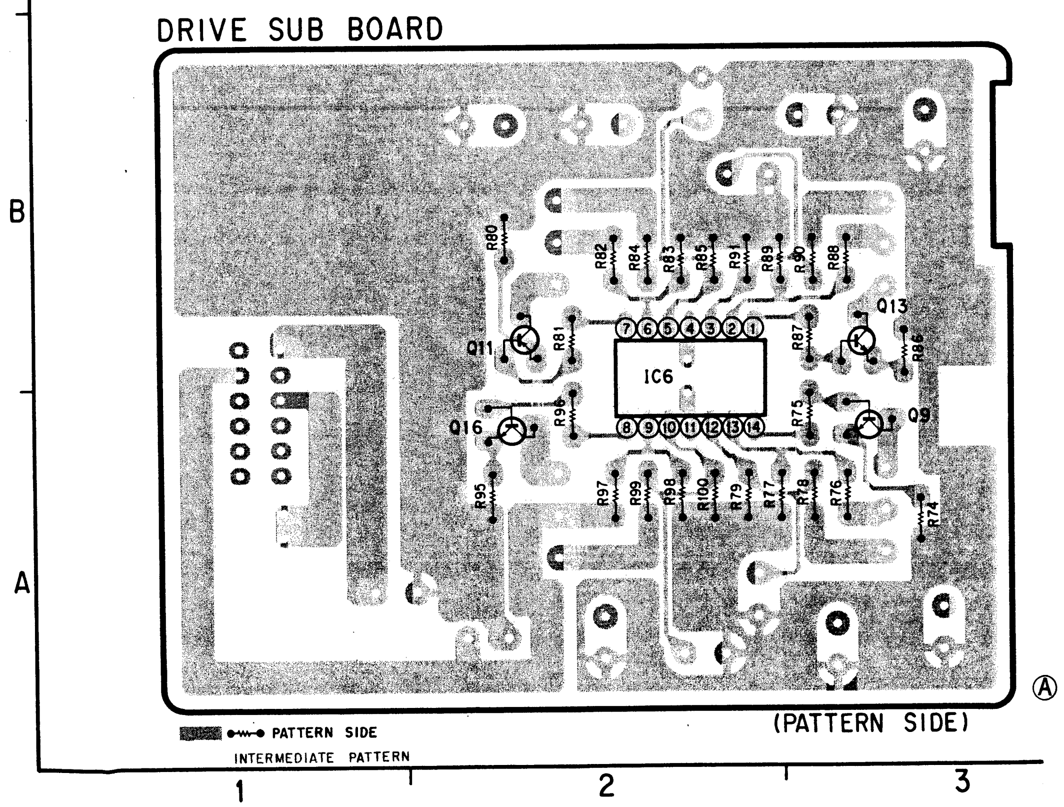
CONDUCTOR VIEW OF SENSOR BOARD



SENSOR BOARD (B CHANNEL)
SENSOR BOARD (G CHANNEL)
SENSOR BOARD (R CHANNEL)
To MOTHER BOARD ---CN11
CN4
To PREAMP BOARD ---CN4
To PREAMP BOARD ---CN3
To PREAMP BOARD ---CN2
CN1
CN2
CN3
GROUND
VR1 ØR VOLTAGE(B)
VR2 ØR VOLTAGE(G)
VR3 ØR VOLAGE(R)
IC101
IC102
IC201
IC202
IC301
IC302
VRZE350E1A
Bch
Rch
Ⓐ
COMPONENT SIDE
INTERMEDIATE PATTERN
(COMPONENT SIDE)
PATTERN SIDE
INTERMEDIATE PATTERN
(PATTERN SIDE)
E
D
C
B
A
1
2
3
4
5
6

CONDUCTOR VIEW OF DRIVE SUB BOARD


D
C
DRIVE SUB BOARD
CN5
2 1
4 3
6 5
8 7
10 9
12 11
To DRIVE BOARD ----CN4
C32
C43
C44
C45
C33
C34
C35
Q15
Q8
Q10
Q12
C40
C41
C36
C38
C37
C39
Ⓐ
(COMPONENT SIDE)
COMPONENT SIDE
INTERMEDIATE PATTERN


B
A
DRIVE SUB BOARD
R80
R82
R84
R83
R85
R91
R89
R90
R88
R81
R87
R86
Q11
Q13
IC6
Q16
Q9
R96
R75
R95
R97
R99
R98
R100
R79
R77
R78
R76
R74
Ⓐ
(PATTERN SIDE)
PATTERN SIDE
INTERMEDIATE PATTERN
1
2
3

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DRIVE SUB BOARD
COMPONENT SIDE

Ref No.	Address
Q8	D3
Q10	C2
Q12	C3
Q15	D2

DRIVE SUB BOARD
PATTERN SIDE

Ref No.	Address
IC6	B2
Q9	A3
Q11	B2
Q13	B3
Q16	A2

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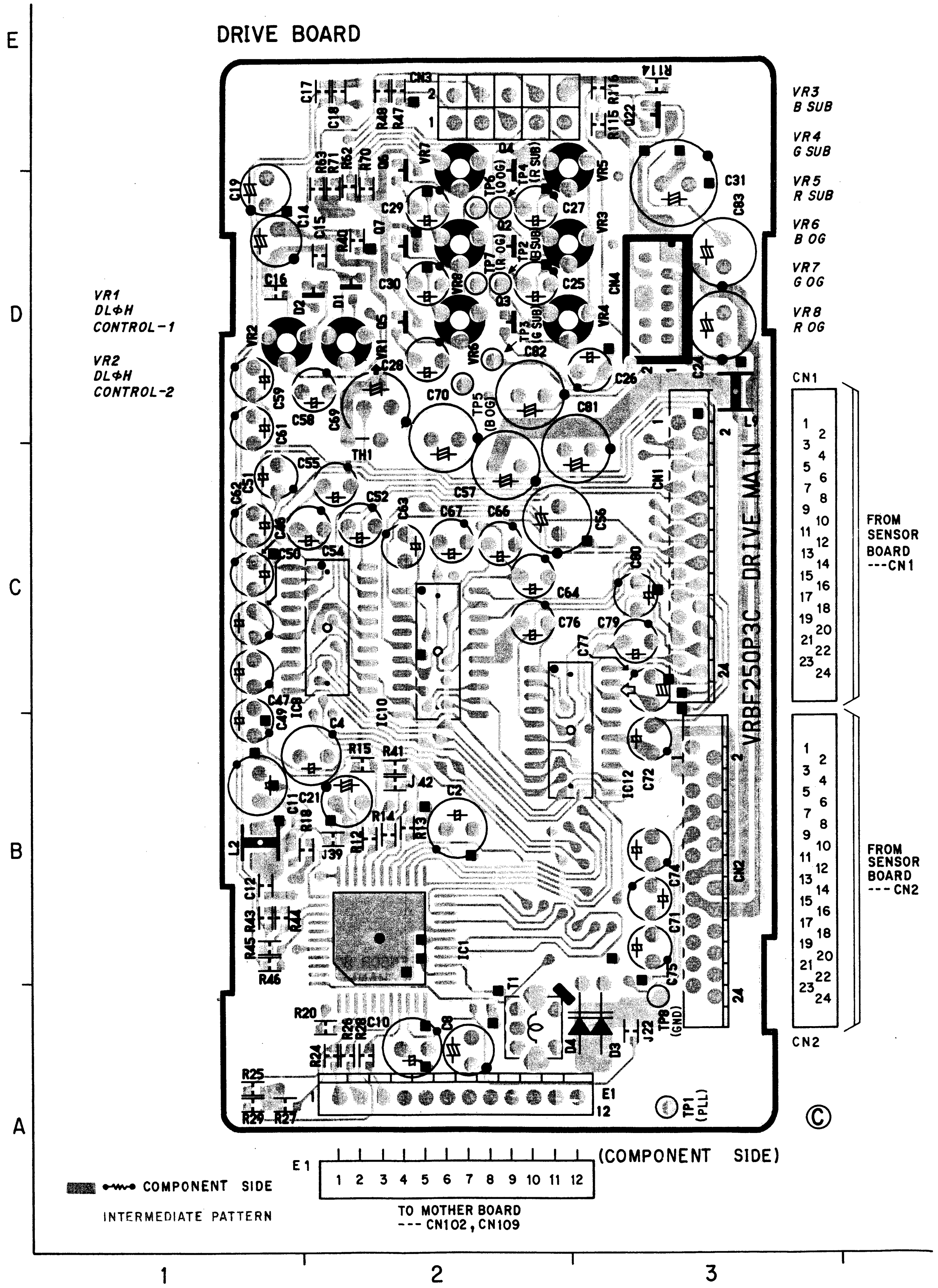
DRIVE BOARD
<COMPONENT SIDE>

Ref No.	Address
IC1	B2
IC8	C2
IC10	C2
IC12	B3
Q2	D2
Q3	D2
Q4	E2
Q5	D2
Q6	E2
Q7	D2
Q22	E3
D1	D2
D2	D2
D3	A3
D4	A3

CONDUCTOR VIEW OF DRIVE


E
D
C
B
A
DRIVE BOARD
VR1 DLΦH CONTROL-1
VR2 DLΦH CONTROL-2
VR3 B SUB
VR4 G SUB
VR5 R SUB
VR6 B OG
VR7 G OG
VR8 R OG
CN1
CN2
CN3
CN4
FROM SENSOR BOARD ---CN1
FROM SENSOR BOARD --- CN2
VRBF250P3C DRIVE MAIN
IC1
IC8
IC10
IC12
TP1 (PLL)
TP8 (GND)
E1
Ⓒ
E1
1 2 3 4 5 6 7 8 9 10 11 12
(COMPONENT SIDE)
TO MOTHER BOARD --- CN102, CN109
COMPONENT SIDE
INTERMEDIATE PATTERN
1
2
3

CONDUCTOR VIEW OF DRIVE BOARD

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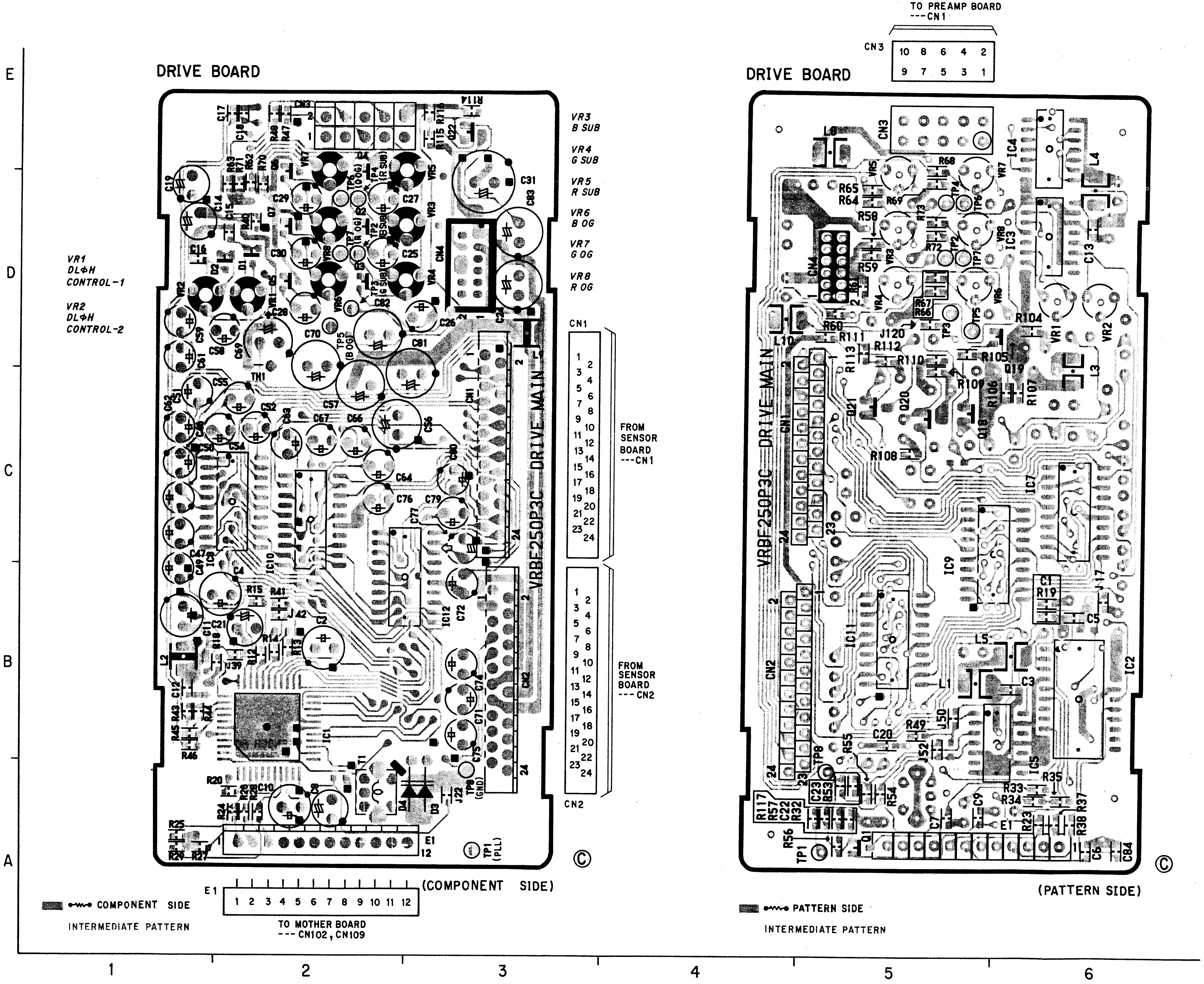
DRIVE BOARD
<COMPONENT SIDE>

Ref No.	Address
IC1	B2
IC8	C2
IC10	C2
IC12	B3
Q2	D2
Q3	D2
Q4	E2
Q5	D2
Q6	E2
Q7	D2
Q22	E3
D1	D2
D2	D2
D3	A3
D4	A3


E
D
C
B
A
1
2
3
4
5
6
DRIVE BOARD
VR1
DLΦH
CONTROL-1
VR2
DLΦH
CONTROL-2
VR3
B SUB
VR4
G SUB
VR5
R SUB
VR6
B OG
VR7
G OG
VR8
R OG
CN1
FROM
SENSOR
BOARD
---CN1
FROM
SENSOR
BOARD
---CN2
CN2
VRBF250P3C DRIVE MAIN
E1
1 2 3 4 5 6 7 8 9 10 11 12
(COMPONENT SIDE)
TO MOTHER BOARD
---CN102, CN109
COMPONENT SIDE
INTERMEDIATE PATTERN
TP1 (PLL)
TP8 (GND)
TO PREAMP BOARD
---CN1
CN3
10 8 6 4 2
9 7 5 3 1
DRIVE BOARD
(PATTERN SIDE)
PATTERN SIDE
INTERMEDIATE PATTERN
IC1
IC2
IC3
IC4
IC5
IC7
IC8
IC9
IC10
IC11
IC12
CN3
CN4
L1
L2
L3
L4
L5
L8
L10
Q18
Q19
Q20
Q21
J120
©

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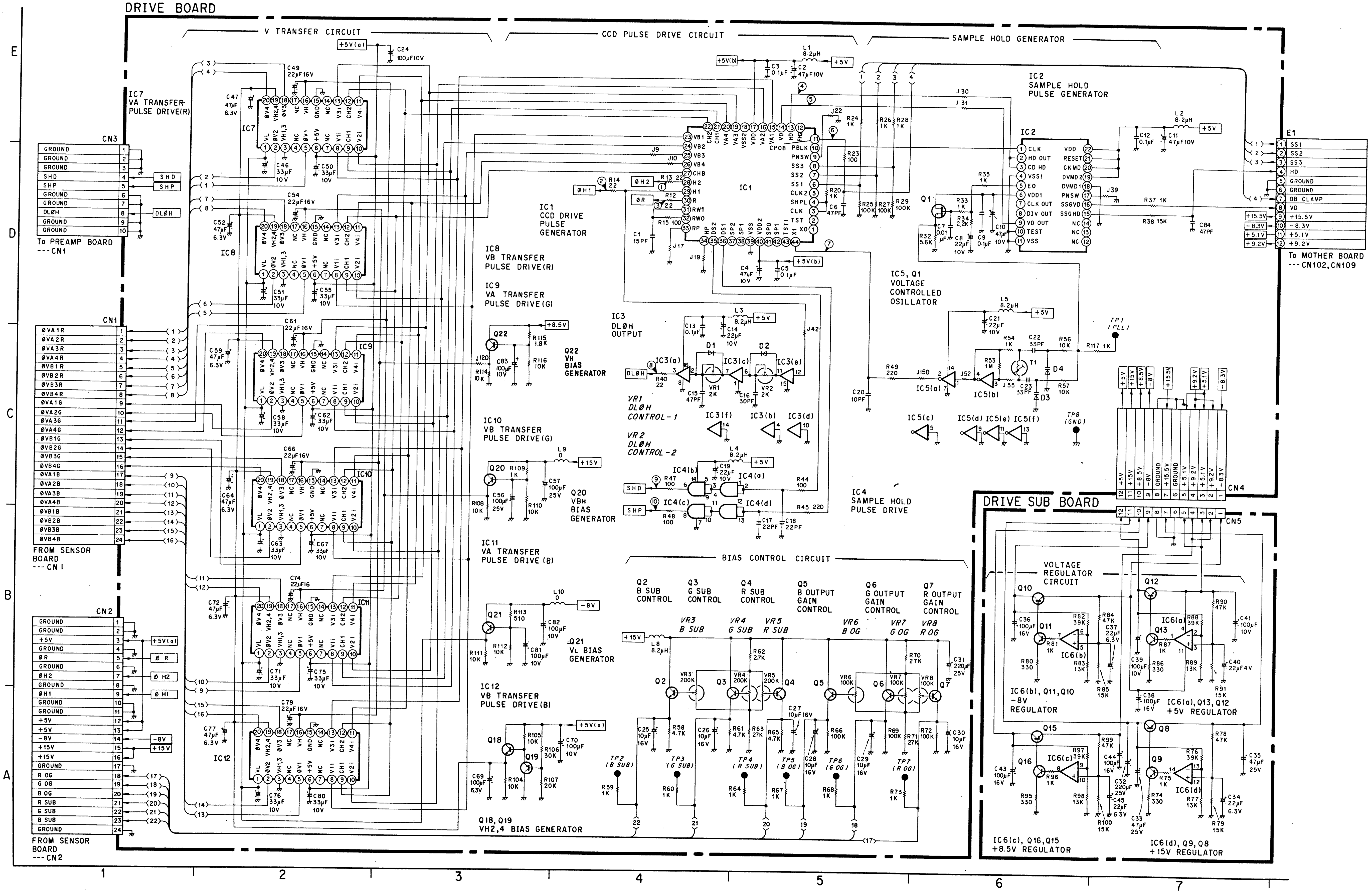
DRIVE BOARD
<PATTERN SIDE>

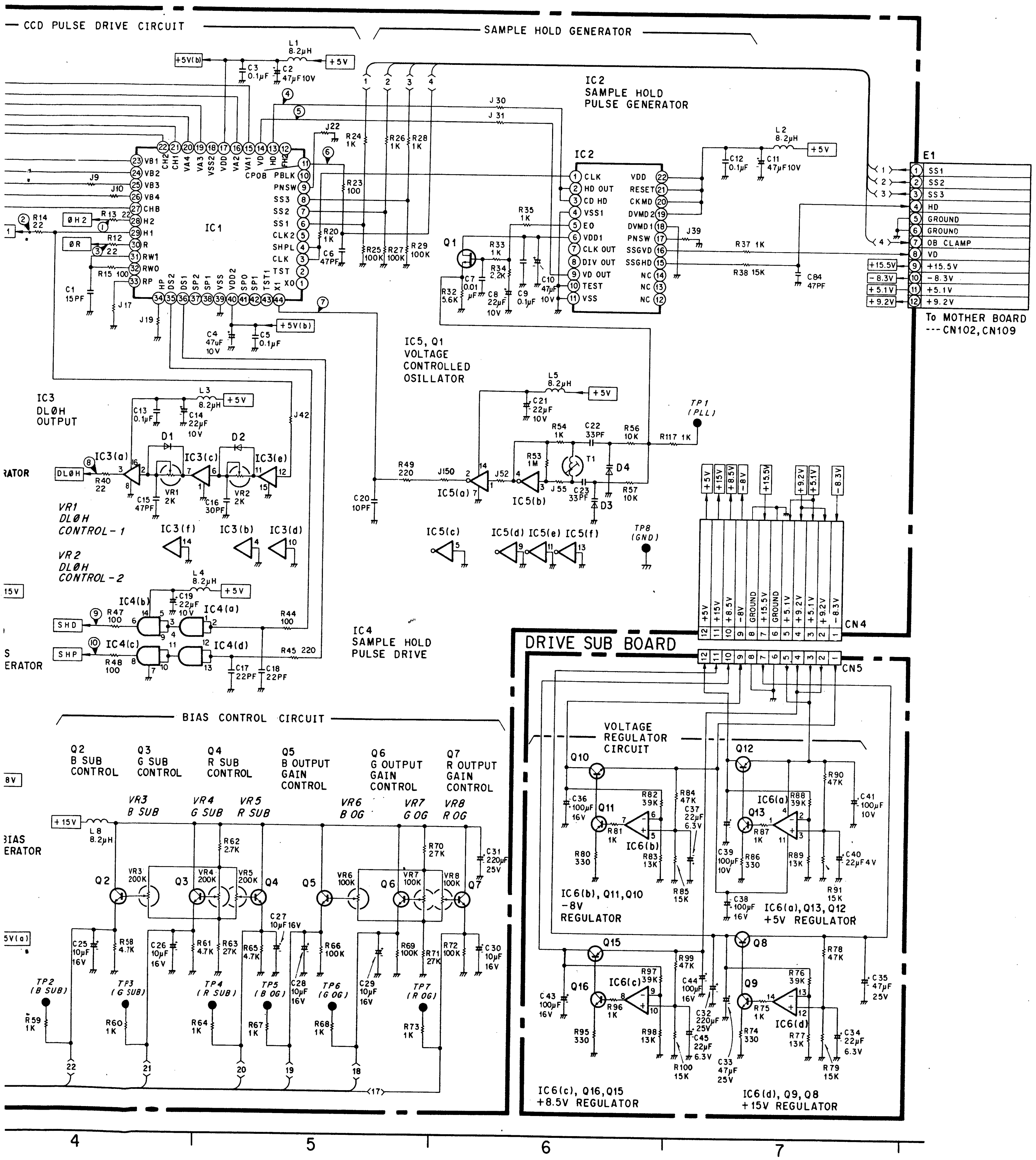
Ref No.	Address
IC2	B6
IC3	D6
IC4	E6
IC5	B6
IC7	C6
IC9	C5
IC11	B5
Q1	A5
Q18	C5
Q19	D6
Q20	C5
Q21	C5

SCHEMATIC DIAGRAM OF DRIVE BOARD



DRIVE BOARD
V TRANSFER CIRCUIT
CCD PULSE DRIVE CIRCUIT
SAMPLE HOLD GENERATOR
IC7 VA TRANSFER PULSE DRIVE(R)
IC8 VB TRANSFER PULSE DRIVE(R)
IC9 VA TRANSFER PULSE DRIVE(G)
IC10 VB TRANSFER PULSE DRIVE(G)
IC11 VA TRANSFER PULSE DRIVE(B)
IC12 VB TRANSFER PULSE DRIVE(B)
IC1 CCD DRIVE PULSE GENERATOR
IC2 SAMPLE HOLD PULSE GENERATOR
IC3 DLØH OUTPUT
IC4 SAMPLE HOLD PULSE DRIVE
IC5, Q1 VOLTAGE CONTROLLED OSCILLATOR
Q22 VH BIAS GENERATOR
Q20 VBH BIAS GENERATOR
Q21 VL BIAS GENERATOR
Q18, Q19 VH2,4 BIAS GENERATOR
VR1 DLØH CONTROL-1
VR2 DLØH CONTROL-2
BIAS CONTROL CIRCUIT
Q2 B SUB CONTROL
Q3 G SUB CONTROL
Q4 R SUB CONTROL
Q5 B OUTPUT GAIN CONTROL
Q6 G OUTPUT GAIN CONTROL
Q7 R OUTPUT GAIN CONTROL
VR3 B SUB
VR4 G SUB
VR5 R SUB
VR6 B OG
VR7 G OG
VR8 R OG
TP1 (PLL)
TP8 (GND)
TP2 (B SUB)
TP3 (G SUB)
TP4 (R SUB)
TP5 (B OG)
TP6 (G OG)
TP7 (R OG)
CN3
GROUND
GROUND
GROUND
SHD
SHP
GROUND
GROUND
DLØH
GROUND
GROUND
To PREAMP BOARD ---CN1
CN1
ØVA1R
ØVA2R
ØVA3R
ØVA4R
ØVB1R
ØVB2R
ØVB3R
ØVB4R
ØVA1G
ØVA2G
ØVA3G
ØVA4G
ØVB1G
ØVB2G
ØVB3G
ØVB4G
ØVA1B
ØVA2B
ØVA3B
ØVA4B
ØVB1B
ØVB2B
ØVB3B
ØVB4B
FROM SENSOR BOARD ---CN1
CN2
GROUND
GROUND
+5V
GROUND
ØR
GROUND
ØH2
GROUND
ØH1
GROUND
GROUND
+5V
+5V
-8V
+15V
+15V
GROUND
R OG
G OG
B OG
R SUB
G SUB
B SUB
GROUND
FROM SENSOR BOARD ---CN2
E1
SS1
SS2
SS3
HD
GROUND
GROUND
OB CLAMP
VD
+15.5V
-8.3V
+5.1V
+9.2V
To MOTHER BOARD ---CN102, CN109
CN4
CN5
DRIVE SUB BOARD
VOLTAGE REGULATOR CIRCUIT
IC6(b), Q11, Q10 -8V REGULATOR
IC6(a), Q13, Q12 +5V REGULATOR
IC6(c), Q16, Q15 +8.5V REGULATOR
IC6(d), Q9, Q8 +15V REGULATOR
A
B
C
D
E
1
2
3
4
5
6
7

C DIAGRAM OF DRIVE BOARD


CCD PULSE DRIVE CIRCUIT
SAMPLE HOLD GENERATOR
IC1
IC2
SAMPLE HOLD
PULSE GENERATOR
IC5, Q1
VOLTAGE
CONTROLLED
OSCILLATOR
IC3
DLØH
OUTPUT
VR1
DLØH
CONTROL-1
VR2
DLØH
CONTROL-2
IC4
SAMPLE HOLD
PULSE DRIVE
E1
SS1
SS2
SS3
HD
GROUND
GROUND
OB CLAMP
VD
+15.5V
-8.3V
+5.1V
+9.2V
To MOTHER BOARD
---CN102,CN109
TP1
(PLL)
TP8
(GND)
CN4
CN5
DRIVE SUB BOARD
VOLTAGE
REGULATOR
CIRCUIT
IC6(b), Q11,Q10
-8V
REGULATOR
IC6(a),Q13,Q12
+5V REGULATOR
IC6(c),Q16,Q15
+8.5V REGULATOR
IC6(d), Q9,Q8
+15V REGULATOR
BIAS CONTROL CIRCUIT
Q2
B SUB
CONTROL
Q3
G SUB
CONTROL
Q4
R SUB
CONTROL
Q5
B OUTPUT
GAIN
CONTROL
Q6
G OUTPUT
GAIN
CONTROL
Q7
R OUTPUT
GAIN
CONTROL
VR3
B SUB
VR4
G SUB
VR5
R SUB
VR6
B OG
VR7
G OG
VR8
R OG
TP2
(B SUB)
TP3
(G SUB)
TP4
(R SUB)
TP5
(B OG)
TP6
(G OG)
TP7
(R OG)
4
5
6
7

< Voltages >

	IC1	IC2		IC1
Pin 1	2.9	-	Pin23	-
2	-	0.7	24	-
3	-	0.7	25	-
4	-	0	26	-
5	-	-	27	-
6	0	4.9	28	1.3
7	0	-	29	0.6
8	0	-	30	0
9	4.8	0.7	31	-
10	-	0	0	0
11	0.1	0	0	-
12	2.4	-	34	0
13	0.7	-	35	-
14	0.2	-	36	-
15	0.2	0.4	37	-
16	0.2	0.2	38	-
17	4.8	4.9	39	0
18	0	0	40	4.8
19	4.6	4.9	41	-
20	4.6	4.9	42	-
21	4.8	4.9	43	-
22	4.8	4.9	44	2.6

	IC3	IC4	IC5
Pin 1	0	-	2.4
2	1.2	-	-
3	0	-	2.4
4	0	-	2.4
5	0	-	0
6	2.2	-	4.9
7	1.0	0	0
8	0	-	4.7
9	0	-	0
10	0	-	4.9
11	0.3	-	0
12	0.6	-	4.9
13	0	-	0
14	0	4.9	4.9
15	0		
16	4.9		

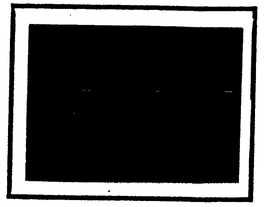
	IC7	IC8	IC9	IC10	IC11	IC12
Pin 1	-6.9	-6.9	-6.9	-6.9	-6.9	-6.9
2	-	-	-	-	-	-
3	0	0	0	0	0	0
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	4.9	4.9	4.9	4.9	4.9	4.9
7	-	-	-	-	-	-
8	0.2	0.2	0.2	0.2	0.2	0.2
9	4.8	4.8	4.8	4.8	4.8	4.8
10	0.2	0.2	0.2	0.2	0.2	0.2
11	4.6	4.6	4.6	4.6	4.6	4.6
12	4.8	4.8	4.8	4.8	4.8	4.8
13	4.6	4.6	4.6	4.6	4.6	4.6
14	-	-	-	-	-	-
15	0	0	0	0	0	0
16	12.9	12.9	12.9	12.9	12.9	12.9
17	-	-	-	-	-	-
18	-	-	-	-	-	-
19	2.0	2.0	2.0	2.0	2.0	2.0
20	-	-	-	-	-	-

	B	C	E
Q 2	10.9	15.0	10.3
3	5.9	15.0	5.3
4	6.9	15.0	6.3
5	5.9	15.0	5.5
6	5.9	15.0	5.5
7	5.9	15.0	5.5
18	2.6	4.9	2.0
19	2.0	0	2.6
20	13.5	14.9	12.9
21	7.5	7.9	6.9

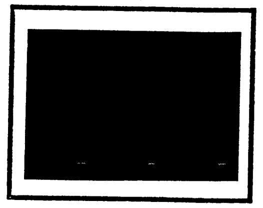
	G	D	S
Q1	2.1	4.9	2.5

< Waveforms >

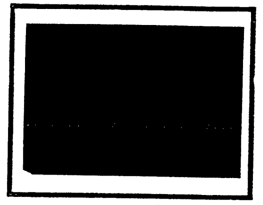
1. 1V/DIV, 20μsec/DIV



2. 1V/DIV, 20μsec/DIV

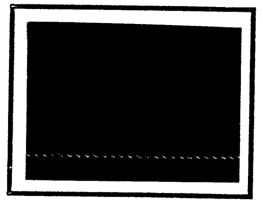


3. 0.5V/DIV, 0.2μsec/DIV

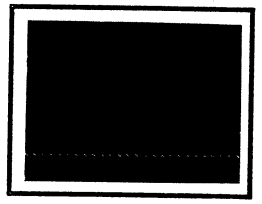


4. 2V/DIV, 20μsec/DIV

5. 1V/DIV, 0.2μsec/DIV

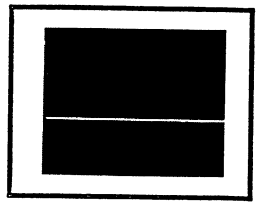


6. 1V/DIV, 0.2μsec/DIV

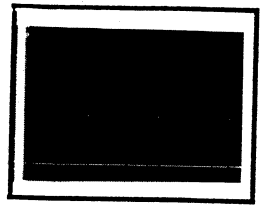


7. 2V/DIV, 20μsec/DIV

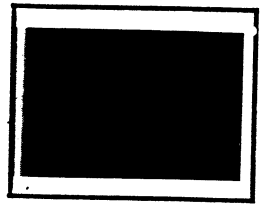
8. 2V/DIV, 20μsec/DIV



9. 2V/DIV, 20μsec/DIV



10. 1V/DIV, 0.2μsec/DIV



<Index>

DRIVE SUB BOARD

Ref No.	Address
IC6	A6, A7, B6, B7
Q8	A7
Q9	A7
Q10	B6
Q11	B6
Q12	B7
Q13	B7
Q15	A6
Q16	A6

< Voltages >

DRIVE SUB BOARD

	B	C	E
Q 8	14.8	15.0	15.5
9	0.6	14.8	0.1
10	-7.7	-8.0	-8.3
11	-0.5	-7.7	0
12	4.4	4.9	5.1
13	0.9	4.4	0.3
15	8.4	8.8	9.2
16	0.8	8.4	0.2

<Index>

DRIVE BOARD

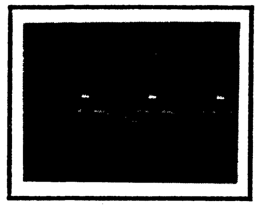
Ref No.	Address
IC1	D5
IC2	D6
IC3	C4, C5
IC4	C4, B4
IC5	C6
IC7	E2
IC8	D2
IC9	C2
IC10	C2
IC11	B2
IC12	A2
Q1	D6
Q2	A4
Q3	A5
Q4	A5
Q5	A5
Q6	A5
Q7	A6
Q8	A3
Q9	A3
Q18	C3
Q19	B3
Q20	C3
Q21	B3
Q22	C3
D1	C4
D2	C5
D3	C6
D4	C6

	IC6
Pin1	0.9
2	1.2
3	1.2
4	5.1
5	-2.0
6	-2.0
7	-0.5
8	0.8
9	2.2
10	2.2
11	-8.3
12	3.7
13	3.7
14	0.6

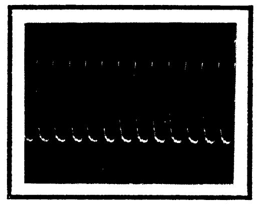
SCHEMATIC DIAGRAM OF PI

< Waveforms >

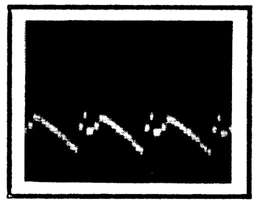
1. 0.2V/DIV, 20µsec/DIV



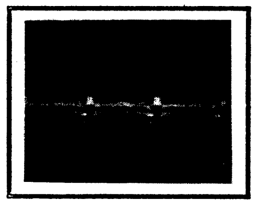
2. 1V/DIV, 0.1µsec/DIV



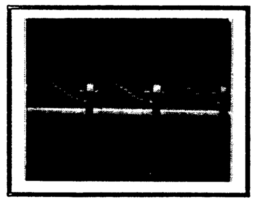
3. 50mV/DIV, 20µsec/DIV



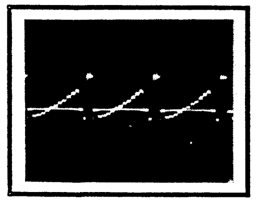
4. 0.1V/DIV, 20µsec/DIV



5. 0.1V/DIV, 20µsec/DIV



6. 0.2V/DIV, 20µsec/DIV



< Voltages >

	B	C	E
Q1	-1.7	-4.6	-1.1
2	8.5	8.9	9.2
3	0.6	8.5	0.1
4	4.4	4.9	5.1
5	0.8	4.4	0.2
6	-4.1	-4.6	-4.8
7	-0.8	-4.1	-0.2
8	-0.8	-4.5	-0.1
101	0.1	-4.5	0.8
103	-0.2	4.9	-0.9
104	-0.9	-4.5	-0.1
106	-0.2	4.9	-0.9
109	-3.9	-4.5	-3.2
112	-0.2	4.9	-0.9
113	-0.8	-4.5	-0.1
115	-0.2	4.9	-0.9
117	1.2	8.5	0.5
201	0.2	-4.6	0.8
203	-0.2	4.9	-0.9
204	-0.9	-4.6	-0.2
206	-0.2	4.9	-0.9
209	-3.9	-4.6	-3.2
212	-0.2	4.9	-0.9
213	-3.8	-4.6	-0.1
215	-0.2	4.9	-0.9
217	1.3	8.5	0.7
301	0.2	-4.6	0.8
303	-0.2	4.9	-0.9
304	-0.9	-4.6	-0.2
306	-0.3	4.9	-1.0
309	-3.9	-4.6	-3.2
312	-0.2	4.9	-0.8
313	-0.8	-4.6	-0.1
315	-0.2	4.9	-0.9
317	1.1	8.5	0.5

	IC1	IC2
Pin 1	-	0.8
2	0.1	1.2
3	0	1.2
4	0	5.1
5	0	2.2
6	-1.0	2.2
7	-1.0	0.6
8	-1.0	4.3
9	-	0
10	-	0
11	-	-4.8
12	0	-1.1
13	0	-1.1
14	-	-0.8
15	0.1	
16	4.9	

	G	D	S	Sub
Q102	-3.1	-0.2	-0.2	-4.5
105	-1.1	-0.1	-0.2	-4.5
114	-1.1	-0.1	-0.1	-4.5
202	-3.1	-0.2	-0.2	-4.6
205	-1.1	0.2	0.2	-4.6
214	-1.1	-0.1	-0.1	-4.6
302	-3.1	-0.2	-0.2	-4.6
305	-1.2	-0.2	-0.3	-4.6
314	-1.2	-0.1	-0.1	-4.6

	Q107	Q108	Q110	Q116	Q207	Q208	Q210	Q216	Q307	Q308	Q310	Q316
Pin 1	4.9	-1.6	4.9	8.8	4.9	-1.6	4.9	8.8	4.9	-1.6	4.9	8.8
2	-0.9	-3.2	0	0.1	-0.9	-3.2	0.2	0.1	-0.9	-3.2	0	0.1
3	0	-1.6	0.6	1.2	0.2	-1.7	0.8	1.3	0	-1.7	0.6	1.1
4	-0.9	-3.2	-4.5	0.1	-1.0	-3.2	-4.6	0.1	-1.0	-3.2	-4.6	0.1
5	-1.6	-3.9	0.6	-0.6	-1.7	-3.9	0.8	-0.6	-1.7	-3.9	0.6	-0.7
6	-1.6	-3.9	-	-0.6	-1.6	-3.9	0.1	-0.6	-1.6	-3.9	-	-0.7

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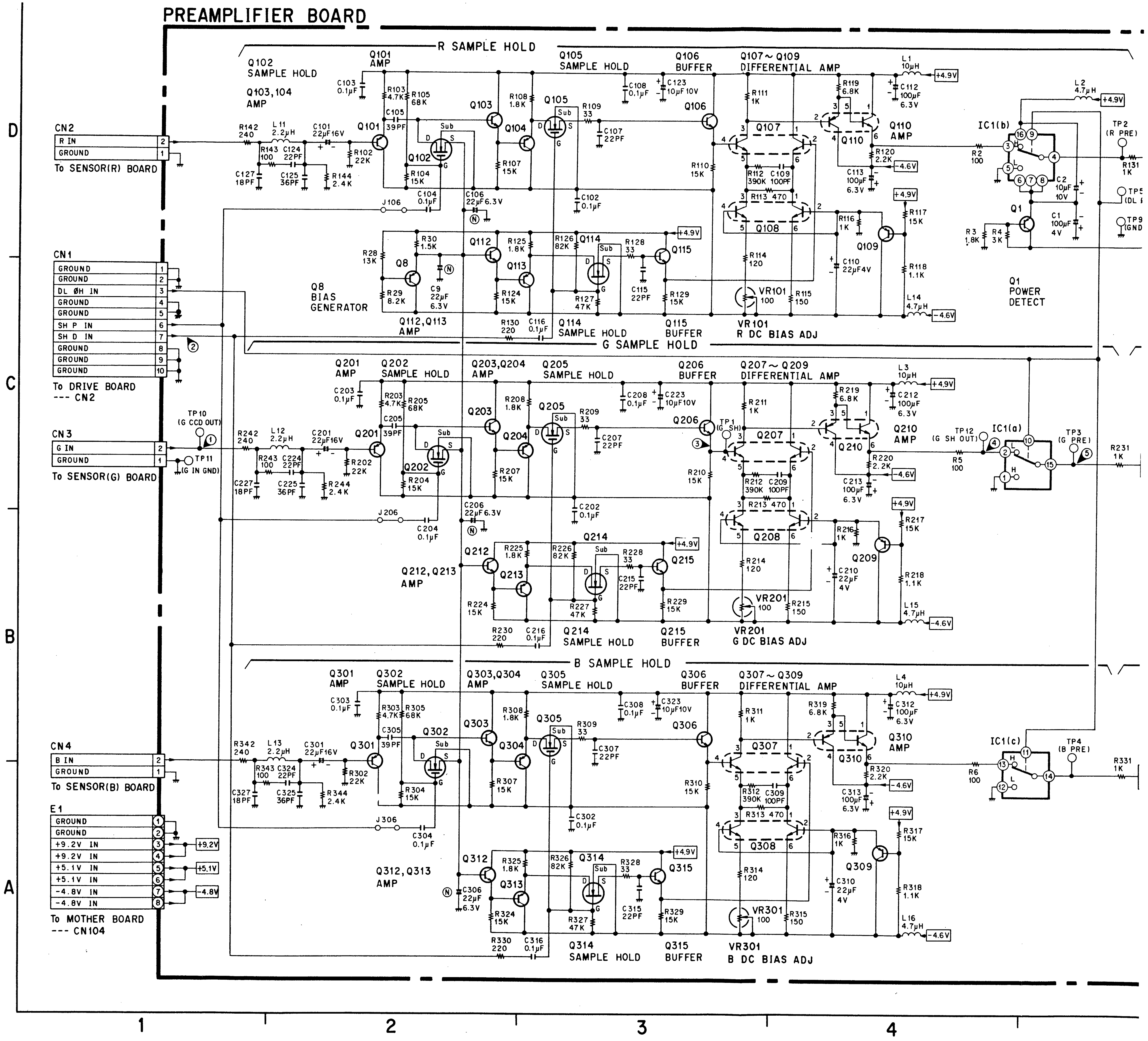
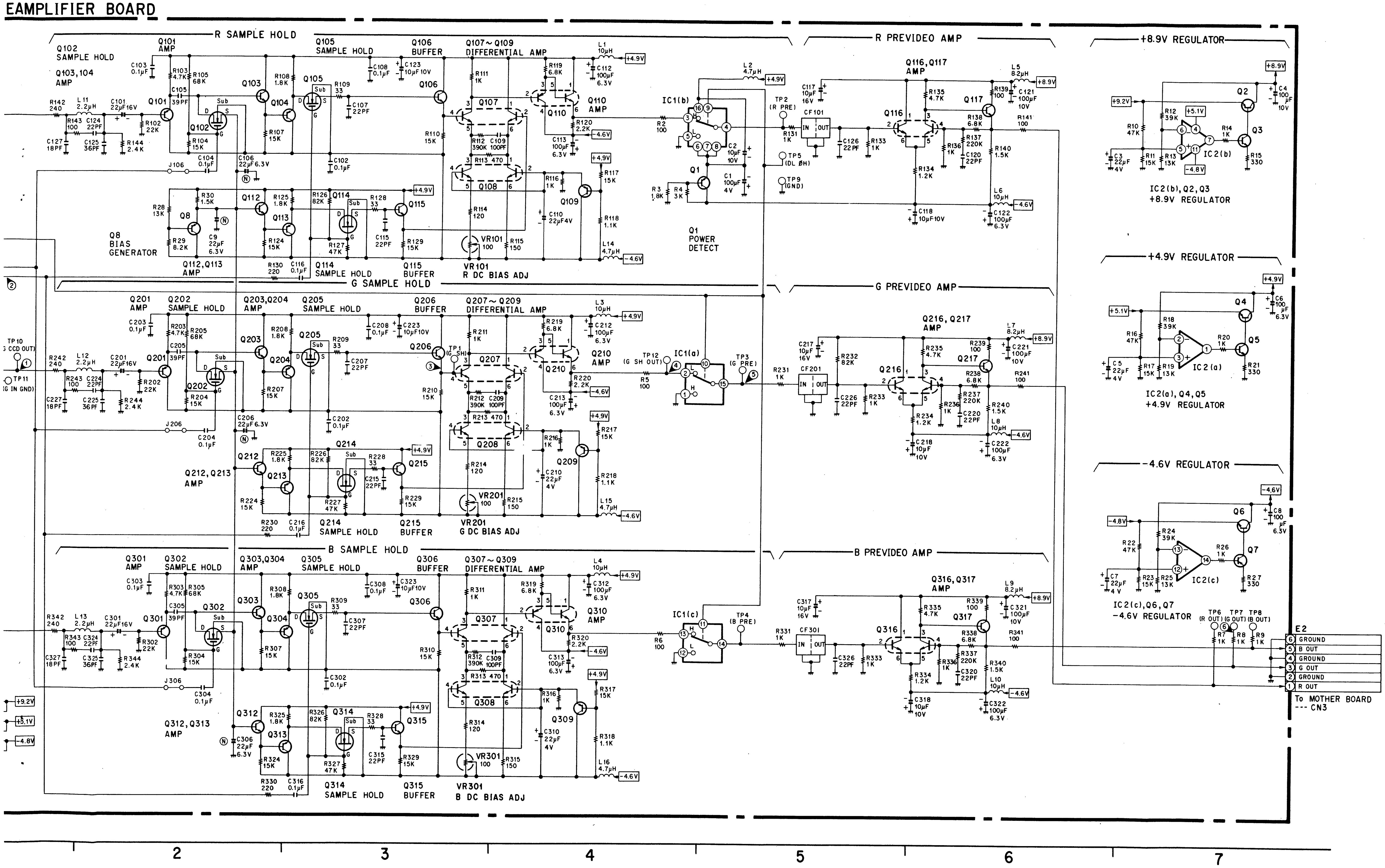
PREAMP BOARD

Ref No.	Address
IC1	B4, C5, D4
IC2	B7, C7, D7
Q1	D5
Q2	D7
Q3	D7
Q4	C7
Q5	C7
Q6	B7
Q7	B7
Q8	C2
Q101	D2
Q102	D2
Q103	D2
Q104	D3
Q105	D3
Q106	D3
Q107	D3, D4
Q108	D3, D4
Q109	D4
Q110	D4
Q112	D2
Q113	C3
Q114	C3
Q115	D3
Q116	D6
Q117	D6
Q201	C2
Q202	C3
Q203	C2
Q204	C3
Q205	C3
Q206	C3
Q207	C3, C4
Q208	B3, B4
Q209	B4
Q210	C4
Q212	B2
Q213	B3
Q214	B3
Q215	B3
Q216	C6
Q217	C6
Q301	B2
Q302	A2
Q303	B2
Q304	B3
Q305	B3
Q306	B3
Q307	B3, B4
Q308	A3, A4
Q309	A4
Q310	B4
Q312	A2
Q313	A3
Q314	A3
Q315	A3
Q316	A6
Q317	B6


PREAMPLIFIER BOARD
R SAMPLE HOLD
G SAMPLE HOLD
B SAMPLE HOLD
Q101 AMP
Q102 SAMPLE HOLD
Q103,104 AMP
Q105 SAMPLE HOLD
Q106 BUFFER
Q107~Q109 DIFFERENTIAL AMP
Q110 AMP
Q8 BIAS GENERATOR
Q112,Q113 AMP
Q114 SAMPLE HOLD
Q115 BUFFER
VR101 R DC BIAS ADJ
Q201 AMP
Q202 SAMPLE HOLD
Q203,Q204 AMP
Q205 SAMPLE HOLD
Q206 BUFFER
Q207~Q209 DIFFERENTIAL AMP
Q210 AMP
Q212,Q213 AMP
Q214 SAMPLE HOLD
Q215 BUFFER
VR201 G DC BIAS ADJ
Q301 AMP
Q302 SAMPLE HOLD
Q303,Q304 AMP
Q305 SAMPLE HOLD
Q306 BUFFER
Q307~Q309 DIFFERENTIAL AMP
Q310 AMP
Q312,Q313 AMP
Q314 SAMPLE HOLD
Q315 BUFFER
VR301 B DC BIAS ADJ
CN2
R IN
GROUND
To SENSOR(R) BOARD
CN1
GROUND
GROUND
DL ØH IN
GROUND
GROUND
SH P IN
SH D IN
GROUND
GROUND
GROUND
To DRIVE BOARD --- CN2
CN3
G IN
GROUND
To SENSOR(G) BOARD
TP10 (G CCD OUT)
TP11 (G IN GND)
CN4
B IN
GROUND
To SENSOR(B) BOARD
E1
GROUND
GROUND
+9.2V IN
+9.2V IN
+5.1V IN
+5.1V IN
-4.8V IN
-4.8V IN
To MOTHER BOARD --- CN104
+9.2V
+5.1V
-4.8V
+4.9V
-4.6V
IC1(b)
IC1(a)
IC1(c)
Q1 POWER DETECT
TP1 (G SH)
TP2 (R PRE)
TP3 (G PRE)
TP4 (B PRE)
TP12 (G SH OUT)
TP5
TP9 (GND)
1
2
3
4
A
B
C
D

SCHEMATIC DIAGRAM OF PREAMP BOARD


EAMPLIFIER BOARD
R SAMPLE HOLD
Q102 SAMPLE HOLD
Q103,104 AMP
Q101 AMP
Q105 SAMPLE HOLD
Q106 BUFFER
Q107～Q109 DIFFERENTIAL AMP
Q110 AMP
Q8 BIAS GENERATOR
Q112,Q113 AMP
Q114 SAMPLE HOLD
Q115 BUFFER
VR101 R DC BIAS ADJ
R PREVIDEO AMP
Q116,Q117 AMP
IC1(b)
Q1 POWER DETECT
TP2 (R PRE)
TP5 (DL ØH)
TP9 (GND)
CF101
+8.9V REGULATOR
IC2(b),Q2,Q3 +8.9V REGULATOR
+4.9V REGULATOR
IC2(a),Q4,Q5 +4.9V REGULATOR
-4.6V REGULATOR
IC2(c),Q6,Q7 -4.6V REGULATOR
G SAMPLE HOLD
Q201 AMP
Q202 SAMPLE HOLD
Q203,Q204 AMP
Q205 SAMPLE HOLD
Q206 BUFFER
Q207～Q209 DIFFERENTIAL AMP
Q210 AMP
TP10 G CCD OUT
TP11 G IN GND
TP1 (G SH)
TP12 (G SH OUT)
IC1(a)
TP3 (G PRE)
G PREVIDEO AMP
Q216,Q217 AMP
CF201
Q212,Q213 AMP
Q214 SAMPLE HOLD
Q215 BUFFER
VR201 G DC BIAS ADJ
B SAMPLE HOLD
Q301 AMP
Q302 SAMPLE HOLD
Q303,Q304 AMP
Q305 SAMPLE HOLD
Q306 BUFFER
Q307～Q309 DIFFERENTIAL AMP
Q310 AMP
IC1(c)
TP4 (B PRE)
B PREVIDEO AMP
Q316,Q317 AMP
CF301
Q312,Q313 AMP
Q314 SAMPLE HOLD
Q315 BUFFER
VR301 B DC BIAS ADJ
TP6 (R OUT)
TP7 (G OUT)
TP8 (B OUT)
E2
6 GROUND
5 B OUT
4 GROUND
3 G OUT
2 GROUND
1 R OUT
To MOTHER BOARD --- CN3
+9.2V
+5.1V
-4.8V
+8.9V
+4.9V
-4.6V
2
3
4
5
6
7

CONDUCTOR VIEW OF PREAMP BOARD

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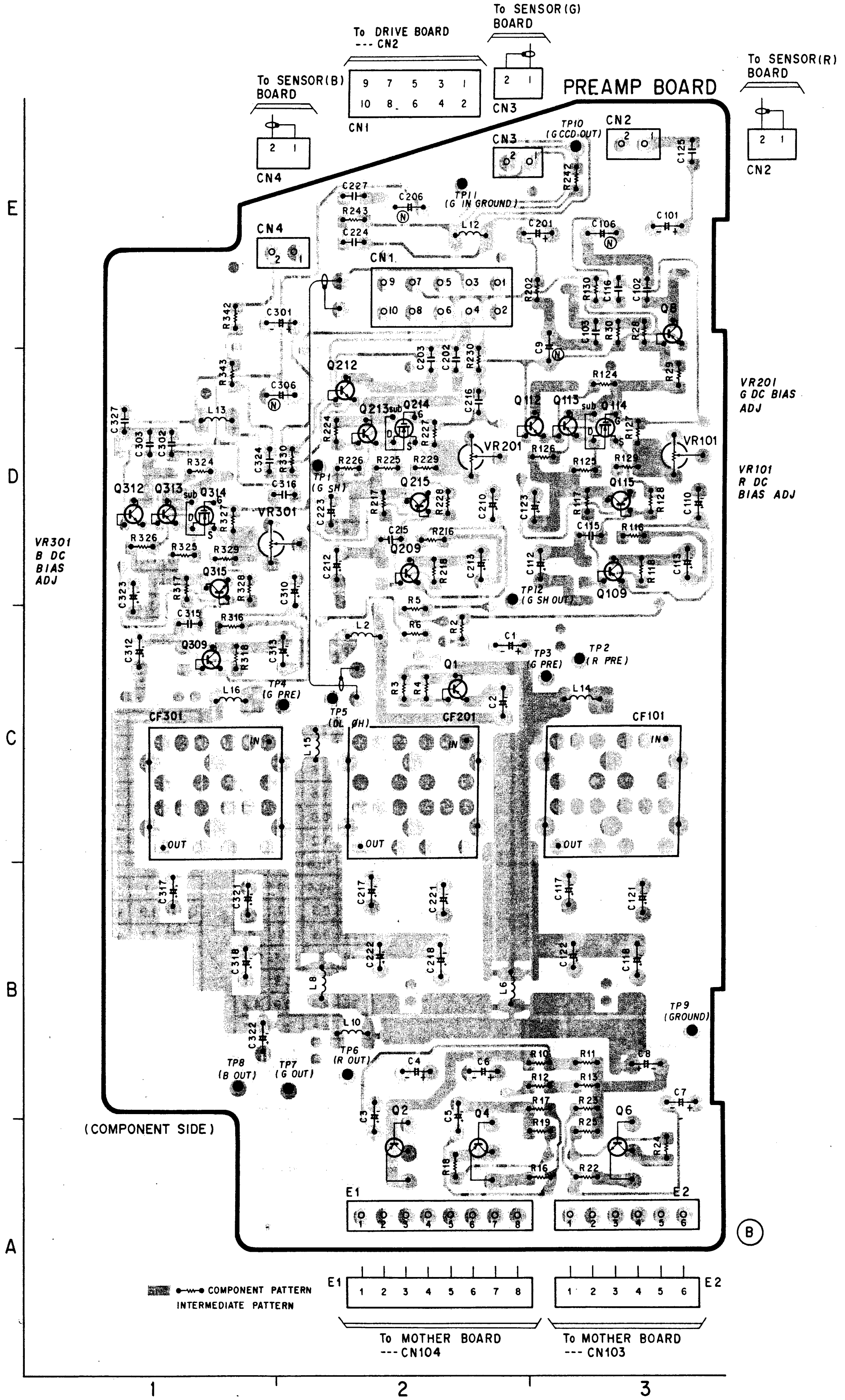
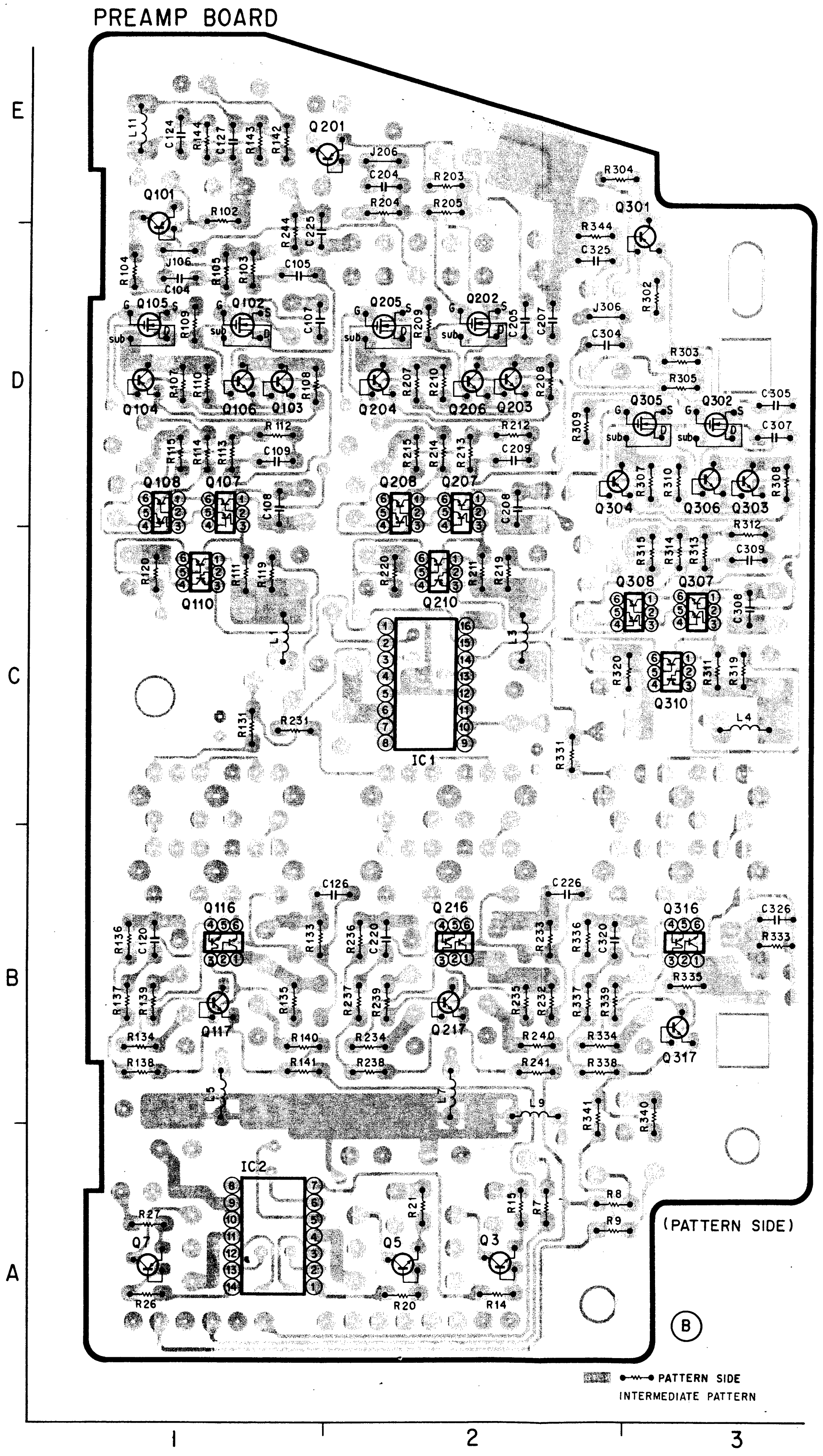
PRE AMP

<COMPONENT SIDE>

Ref No.	Address
Q1	C2
Q2	A2
Q4	A2
Q6	A2
Q8	E3
Q109	D3
Q112	D2
Q113	D3
Q114	D3
Q115	D3
Q212	D2
Q213	D2
Q214	D2
Q215	D2
Q309	C1
Q312	D1
Q313	D1
Q314	D1
Q315	D1


To SENSOR(B) BOARD
To DRIVE BOARD --- CN2
To SENSOR(G) BOARD
To SENSOR(R) BOARD
PREAMP BOARD
CN1
CN2
CN3
CN4
VR201 G DC BIAS ADJ
VR101 R DC BIAS ADJ
VR301 B DC BIAS ADJ
CF301
CF201
CF101
TP9 (GROUND)
TP8 (B OUT)
TP7 (G OUT)
TP6 (R OUT)
E1
E2
(COMPONENT SIDE)
COMPONENT PATTERN
INTERMEDIATE PATTERN
To MOTHER BOARD --- CN104
To MOTHER BOARD --- CN103
E
D
C
B
A
1
2
3


PREAMP BOARD
IC1
IC2
(PATTERN SIDE)
PATTERN SIDE
INTERMEDIATE PATTERN
E
D
C
B
A
1
2
3

< Index >

PRE AMP

<PATTERN SIDE>

Ref No.	Address
IC1	C2
IC2	A1
Q3	A2
Q5	A2
Q7	A1
Q101	E1
Q102	D1
Q103	D1
Q104	D1
Q105	D1
Q106	D1
Q107	D1
Q108	D1
Q110	C1
Q116	B1
Q117	B1
Q201	E1
Q202	D2
Q203	D2
Q204	D2
Q205	D2
Q206	D2
Q207	D2
Q208	D2
Q209	D2
Q210	C2
Q216	B2
Q217	B2
Q301	D3
Q302	D3
Q303	D3
Q304	D2
Q305	D3
Q306	D3
Q307	C3
Q308	C3
Q310	C3
Q316	B3
Q317	B3

CONDUCTOR VIEW OF POWER/ALC BOARD

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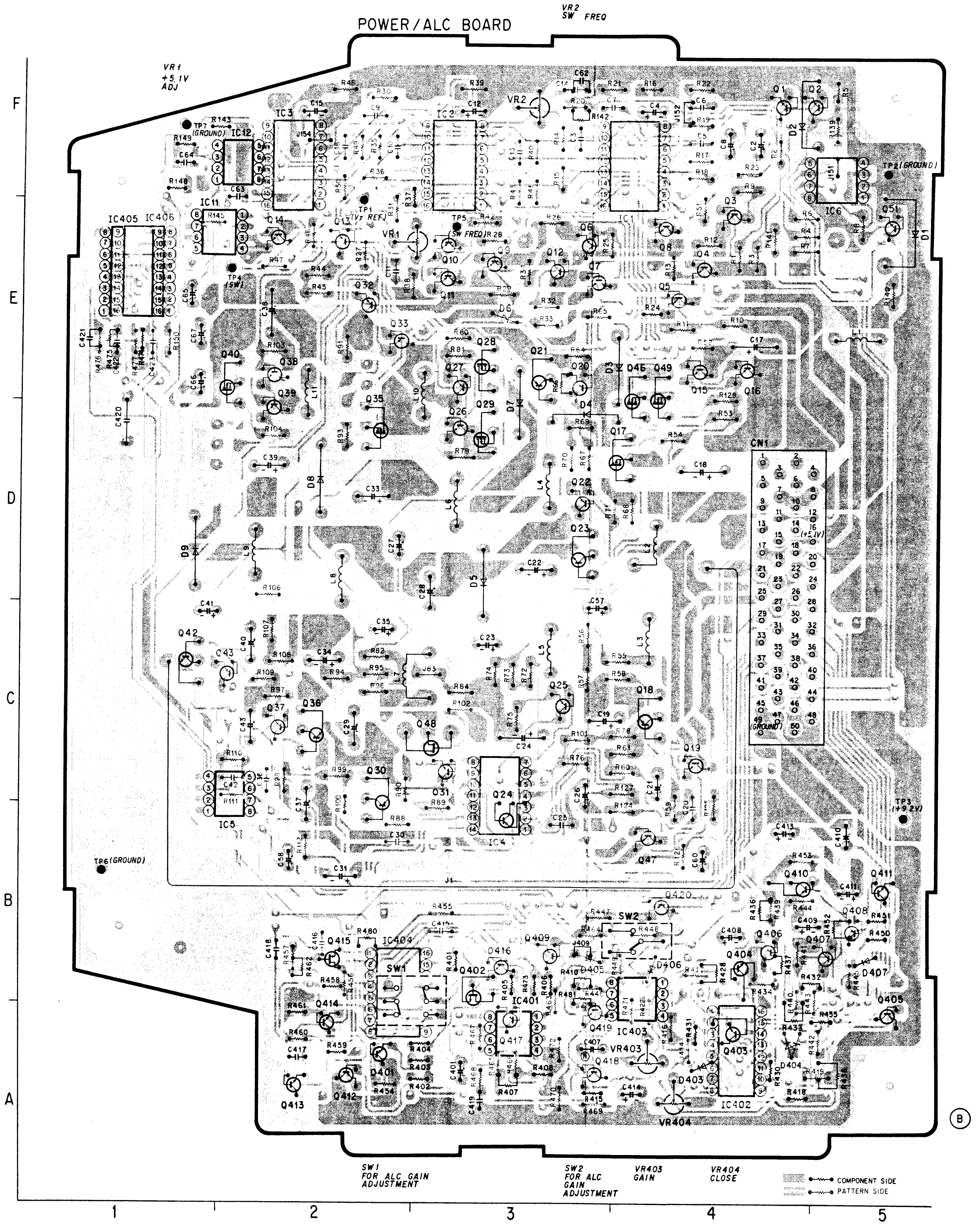
POWER / ALC BOARD

Ref No.	Address
IC1	F4
IC2	F3
IC3	F2
IC4	C3
IC5	C2
IC6	F5
IC11	E1
IC12	F2
IC401	A3
IC402	A4
IC403	B4
IC404	B2
IC405	E1
IC406	E1
Q1	F4
Q2	F5
Q3	E4
Q4	E4
Q5	E4
Q6	E3
Q7	E3
Q8	E4
Q9	E3
Q10	E3
Q11	E3
Q12	E3
Q13	E2
Q14	E2
Q15	E4
Q16	E4
Q17	D4
Q18	C4
Q19	C4
Q20	E3
Q21	E3
Q22	D3
Q23	D3
Q24	B3
Q25	C3
Q26	D3
Q27	E3
Q28	E3
Q29	D3
Q30	C2
Q31	C3
Q32	E2
Q33	E2
Q35	D2
Q36	C2
Q37	C2
Q38	E2
Q39	D2
Q40	E2
Q42	C1
Q43	C2
Q46	E4
Q47	B4
Q48	C3
Q49	E4
Q51	E5
Q401	A2
Q402	B3
Q403	A4
Q404	B4
Q405	A5
Q406	B4
Q407	B5
Q408	B5
Q409	B3
Q410	B4
Q411	B5
Q412	A2
Q413	A2
Q414	A2
Q415	B2
Q416	B3
Q417	A3
Q418	A3
Q419	A3
Q420	B4
D1	E5
D2	F4
D3	E4
D4	D3
D5	D3
D6	E3
D7	E3
D8	D2
D9	D1
D10	A5
D403	A4
D404	A4
D405	B3
D406	B4
D407	B5


POWER / ALC BOARD
VR2 SW FREQ
VR1 +5.1V ADJ
TP7 (GROUND)
TP1 (+5.1V REF)
TP5 SW FREQ
TP4 (SW)
TP2 (GROUND)
TP3 (+9.2V)
TP6 (GROUND)
CN1
F
E
D
C
B
A
1
2
3
4
5
Ⓑ
SW1 FOR ALC GAIN ADJUSTMENT
SW2 FOR ALC GAIN ADJUSTMENT
VR403 GAIN
VR404 CLOSE
COMPONENT SIDE
PATTERN SIDE

< Voltages >

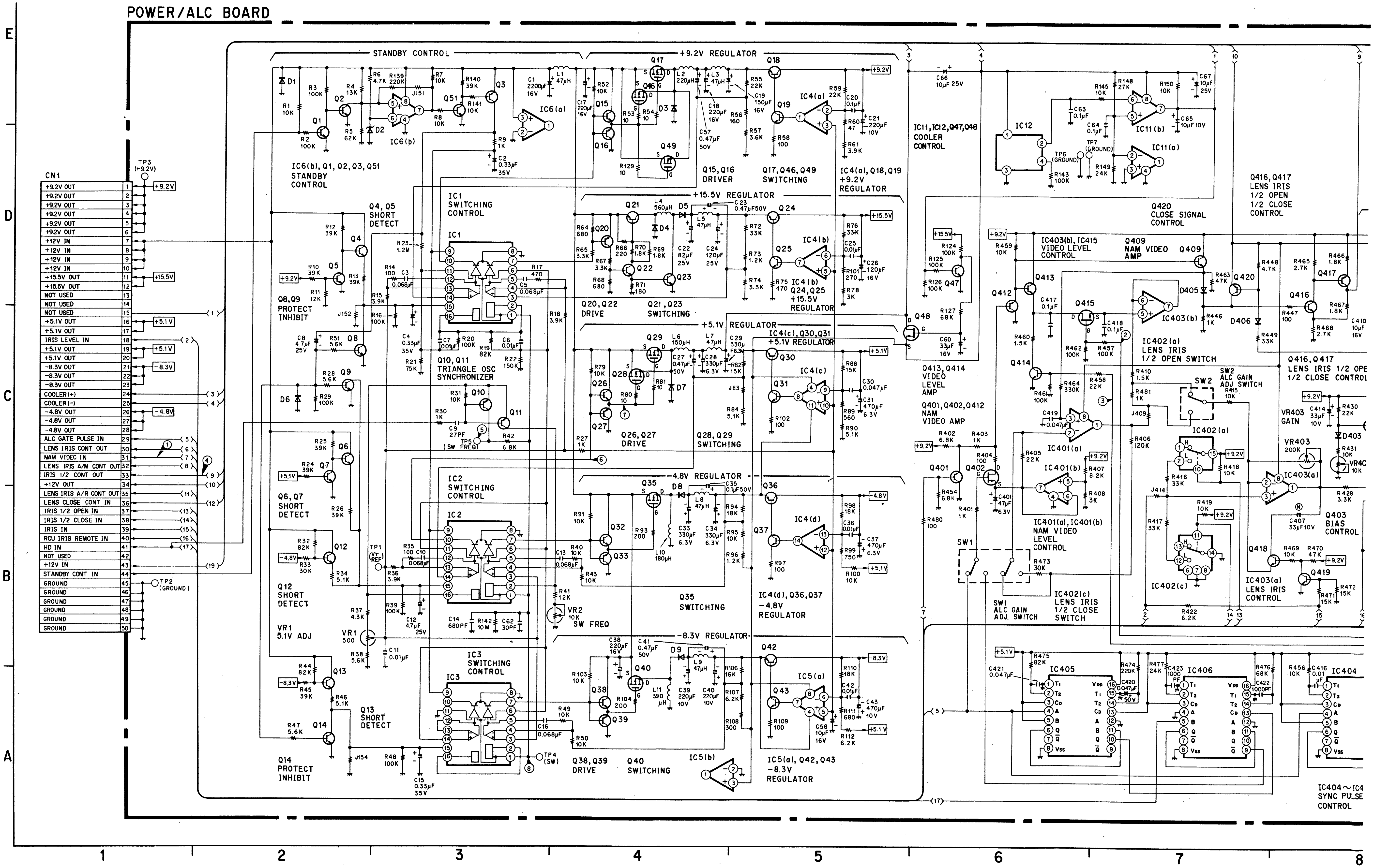
	IC1	IC2	IC3	IC4	IC5	IC6	IC11	IC12	IC401	IC402	IC403	IC404	IC405	IC406
Pin 1	1.7	1.7	1.7	1.2	5.3	-	0	5.5	3.3	1.2	6.3	0	0	0
2	2.5	1.0	2.5	1.4	0	0	2.6	0.7	2.6	4.3	4.3	5.1	4.3	3.9
3	1.4	1.4	1.4	1.4	5.5	10.9	0	0	2.6	6.3	4.3	5.1	5.1	5.1
4	1.4	1.4	1.4	5.5	-7.8	0	0	0.1	0	6.3	0	1.4	1.4	0
5	1.9	1.9	1.8	1.4	1.4	8.8	2.6	-	2.5	0	3.0	5.1	5.1	0.6
6	1.7	1.7	1.7	1.4	1.4	6.1	0	-	2.5	0	3.1	0	1.1	1.0
7	7.5	7.9	6.8	0.6	-0.6	5.9	4.6	-	2.5	0	3.1	5.1	4.0	4.2
8	0	0	0	0.9	5.5	10.9	5.5	-	11.1	0	11.1	0	0	0
9	6.7	6.7	6.7	1.4*						11.1		5.1	2.2	3.7
10	1.6	4.8	0	1.4						8.7		0.1	2.9	1.5
11	1.4	1.7	0	-5.2						8.7		0	1.1	1.0
12	1.5	1.7	1.7	1.4						4.3		0	0	0
13	1.4	1.4	1.7	1.4						0		5.1	0.1	2.9
14	1.4	1.4	1.7	-0.7						0		5.1	3.1	2.8
15	0	0	0							9.2		0	0.1	0
16	2.5	2.5	2.5							11.1		5.1	5.1	5.1

	B	C	E
Q 1	0.6	0	0
2	0	8.9	0
3	10.2	10.9	10.9
4	0	10.9	0
5	0.6	0	0
6	0	10.9	0
7	0.6	0	0
8	0	0	0
9	0	0	0
10	2.5	1.8	2.5
11	2.5	1.0	2.5
12	-0.6	10.9	0
13	-2.1	10.9	0
14	0	0	0
15	1.6	10.8	1.0
16	1.6	0	1.0
18	8.9	9.2	9.6
19	1.2	8.9	0.5
20	10.6	4.0	10.8
21	10.4	6.0	10.8
22	0.5	6.7	0.5
23	0.5	5.9	0
24	15.3	15.5	15.9
25	0.6	15.3	0.1
26	4.8	10.9	4.2
27	4.8	0	4.2
30	4.9	5.1	5.5
31	0.9	4.9	0.2
32	7.9	10.8	7.5
33	7.9	0	7.5
36	-4.6	-4.8	-5.2
37	-0.7	-4.6	-0.1
38	6.8	10.9	6.5
39	6.8	0	6.5
42	-8.1	-8.3	-8.7
43	-0.6	-8.1	0
47	0.6	0	0
51	0.7	0	0

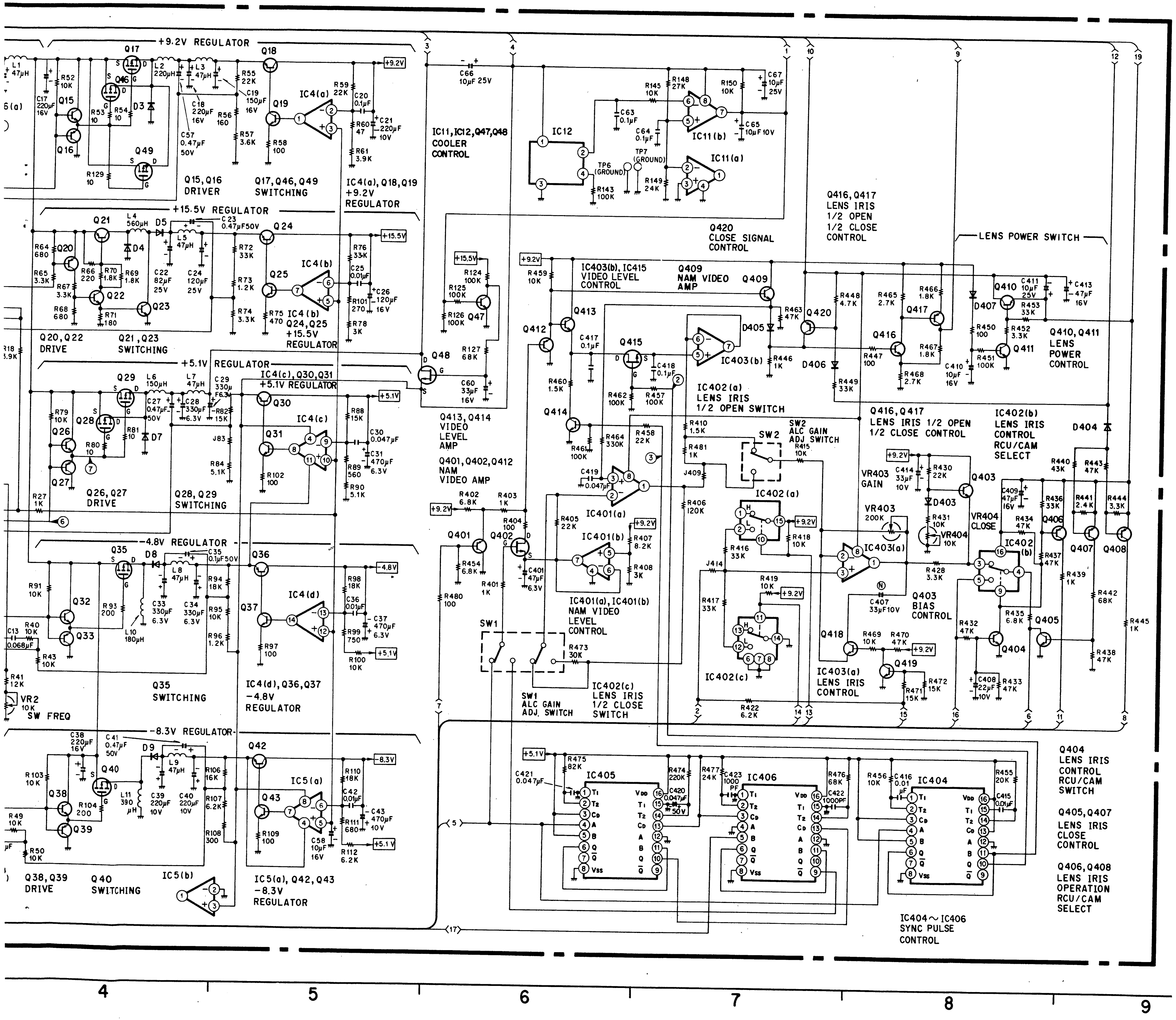
	B	C	E
Q401	2.0	0	2.7
403	4.0	9.2	6.3
404	0	11.1	0
405	0	6.3	0
406	11.1	0	11.1
407	11.1	0	11.1
408	11.0	0	11.1
409	3.2	9.2	2.6
410	10.4	11.1	11.1
411	0.7	0.1	0
412	2.6	0	3.2
413	3.2	0	3.0
414	0	2.9	0
416	2.0	8.3	1.4
417	8.3	1.7	8.9
418	0	7.9	4.3
419	0.7	0	0
420	11.0	1.9	11.1

	G	D	S
Q 17	1.0	10.0	10.8
28	4.2	6.6	10.8
29	4.2	6.6	10.8
35	7.5	0.1	10.8
40	6.5	0.1	10.8
46	1.0	10.0	10.8
48	0	6.5	5.5
49	1.0	10.0	10.8
402	1.0	2.5	2.6
415	0	3.0	3.0

SCHEMATIC DIAGRAM OF POWER/ALC BOARD


POWER/ALC BOARD
E
D
C
B
A
1
2
3
4
5
6
7
8
CN1
1 +9.2V OUT
2 +9.2V OUT
3 +9.2V OUT
4 +9.2V OUT
5 +9.2V OUT
6 +9.2V OUT
7 +12V IN
8 +12V IN
9 +12V IN
10 +12V IN
11 +15.5V OUT
12 +15.5V OUT
13 NOT USED
14 NOT USED
15 NOT USED
16 +5.1V OUT
17 +5.1V OUT
18 IRIS LEVEL IN
19 +5.1V OUT
20 +5.1V OUT
21 -8.3V OUT
22 -8.3V OUT
23 -8.3V OUT
24 COOLER(+)
25 COOLER(-)
26 -4.8V OUT
27 -4.8V OUT
28 -4.8V OUT
29 ALC GATE PULSE IN
30 LENS IRIS CONT OUT
31 NAM VIDEO IN
32 LENS IRIS A/M CONT OUT
33 IRIS 1/2 CONT OUT
34 +12V OUT
35 LENS IRIS A/R CONT OUT
36 LENS CLOSE CONT IN
37 IRIS 1/2 OPEN IN
38 IRIS 1/2 CLOSE IN
39 IRIS IN
40 RCU IRIS REMOTE IN
41 HD IN
42 NOT USED
43 +12V IN
44 STANDBY CONT IN
45 GROUND
46 GROUND
47 GROUND
48 GROUND
49 GROUND
50 GROUND
TP3 (+9.2V)
TP2 (GROUND)
STANDBY CONTROL
IC6(b), Q1, Q2, Q3, Q51 STANDBY CONTROL
+9.2V REGULATOR
Q15, Q16 DRIVER
Q17, Q46, Q49 SWITCHING
IC4(a), Q18, Q19 +9.2V REGULATOR
IC1 SWITCHING CONTROL
Q4, Q5 SHORT DETECT
Q8, Q9 PROTECT INHIBIT
Q10, Q11 TRIANGLE OSC SYNCHRONIZER
+15.5V REGULATOR
Q20, Q22 DRIVE
Q21, Q23 SWITCHING
IC4(b) Q24, Q25 +15.5V REGULATOR
+5.1V REGULATOR
IC4(c), Q30, Q31 +5.1V REGULATOR
Q26, Q27 DRIVE
Q28, Q29 SWITCHING
Q6, Q7 SHORT DETECT
IC2 SWITCHING CONTROL
-4.8V REGULATOR
Q35 SWITCHING
IC4(d), Q36, Q37 -4.8V REGULATOR
Q12 SHORT DETECT
VR1 5.1V ADJ
VR2 SW FREQ
TP1 (Vt REF)
TP5 (SW FREQ)
TP4 (SW)
IC3 SWITCHING CONTROL
Q13 SHORT DETECT
Q14 PROTECT INHIBIT
-8.3V REGULATOR
Q38, Q39 DRIVE
Q40 SWITCHING
IC5(b)
IC5(a), Q42, Q43 -8.3V REGULATOR
IC11, IC12, Q47, Q48 COOLER CONTROL
IC12
IC11(a)
IC11(b)
TP6 (GROUND)
TP7 (GROUND)
Q416, Q417 LENS IRIS 1/2 OPEN 1/2 CLOSE CONTROL
Q420 CLOSE SIGNAL CONTROL
IC403(b), IC415 VIDEO LEVEL CONTROL
Q409 NAM VIDEO AMP
IC402(a) LENS IRIS 1/2 OPEN SWITCH
SW2 ALC GAIN ADJ SWITCH
Q416, Q417 LENS IRIS 1/2 OPEN 1/2 CLOSE CONTROL
Q413, Q414 VIDEO LEVEL AMP
Q401, Q402, Q412 NAM VIDEO AMP
IC401(a), IC401(b) NAM VIDEO LEVEL CONTROL
SW1 ALC GAIN ADJ. SWITCH
IC402(c) LENS IRIS 1/2 CLOSE SWITCH
IC403(a) LENS IRIS CONTROL
VR403 GAIN
VR403
Q403 BIAS CONTROL
IC405
IC406
IC404
IC404~IC4 SYNC PULSE CONTROL

EMATIC DIAGRAM OF POWER/ALC BOARD



+9.2V REGULATOR
Q15,Q16 DRIVER
Q17,Q46,Q49 SWITCHING
IC4(a),Q18,Q19 +9.2V REGULATOR
+15.5V REGULATOR
Q20,Q22 DRIVE
Q21,Q23 SWITCHING
IC4(b) Q24,Q25 +15.5V REGULATOR
+5.1V REGULATOR
IC4(c),Q30,Q31 +5.1V REGULATOR
Q26,Q27 DRIVE
Q28,Q29 SWITCHING
-4.8V REGULATOR
Q35 SWITCHING
IC4(d),Q36,Q37 -4.8V REGULATOR
VR2 SW FREQ
-8.3V REGULATOR
Q38,Q39 DRIVE
Q40 SWITCHING
IC5(a),Q42,Q43 -8.3V REGULATOR
IC11,IC12,Q47,Q48 COOLER CONTROL
TP6 (GROUND)
TP7 (GROUND)
Q420 CLOSE SIGNAL CONTROL
Q416,Q417 LENS IRIS 1/2 OPEN 1/2 CLOSE CONTROL
LENS POWER SWITCH
IC403(b),IC415 VIDEO LEVEL CONTROL
Q409 NAM VIDEO AMP
Q413,Q414 VIDEO LEVEL AMP
Q401,Q402,Q412 NAM VIDEO AMP
IC402(a) LENS IRIS 1/2 OPEN SWITCH
SW2 ALC GAIN ADJ SWITCH
Q416,Q417 LENS IRIS 1/2 OPEN 1/2 CLOSE CONTROL
IC402(b) LENS IRIS CONTROL RCU/CAM SELECT
Q410,Q411 LENS POWER CONTROL
VR403 GAIN
VR404 CLOSE
Q403 BIAS CONTROL
IC401(a),IC401(b) NAM VIDEO LEVEL CONTROL
SW1 ALC GAIN ADJ. SWITCH
IC402(c) LENS IRIS 1/2 CLOSE SWITCH
IC403(a) LENS IRIS CONTROL
IC405
IC406
IC404
IC404~IC406 SYNC PULSE CONTROL
Q404 LENS IRIS CONTROL RCU/CAM SWITCH
Q405,Q407 LENS IRIS CLOSE CONTROL
Q406,Q408 LENS IRIS OPERATION RCU/CAM SELECT
+9.2V
+15.5V
+5.1V
-4.8V
-8.3V
4
5
6
7
8
9

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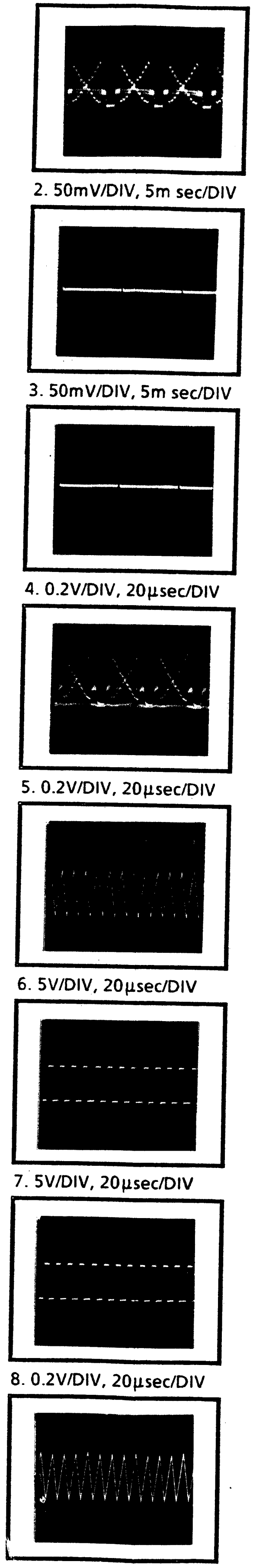
1. 0.2V/DIV, 20µsec/DIV

2. 50mV/DIV, 5m sec/DIV

3. 50mV/DIV, 5m sec/DIV

4. 0.2V/DIV, 20µsec/DIV

5. 0.2V/DIV, 20µsec/DIV

6. 5V/DIV, 20µsec/DIV

7. 5V/DIV, 20µsec/DIV

8. 0.2V/DIV, 20µsec/DIV

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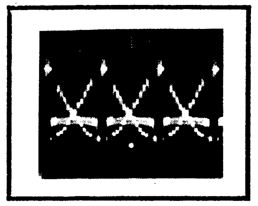
POWER / ALC BOARD

Ref No.	Address
IC1	D3
IC2	B3
IC3	A3
IC4	B5, C5, D5, E5
IC5	A4, A5
IC6	E3
IC11	D7, E7
IC12	D6
IC401	C6
IC402	B7, C7, C8
IC403	C8
IC404	A8
IC405	A6
IC406	A7
Q1	D2
Q2	E2
Q3	E3
Q4	D2
Q5	D2
Q6	C2
Q7	C2
Q8	C2
Q9	C2
Q10	C3
Q11	C3
Q12	B12
Q13	A2
Q14	A2
Q15	E4
Q16	D4
Q17	E4
Q18	E5
Q19	E5
Q20	D4
Q21	D4
Q22	D4
Q23	D4
Q24	D5
Q25	D5
Q26	C4
Q27	C4
Q28	C4
Q29	C4
Q30	C5
Q31	C5
Q32	B4
Q33	B4
Q35	B4
Q36	B5
Q37	B5
Q38	A4
Q39	A4
Q40	A4
Q42	B5
Q43	A5
Q46	E4
Q47	D6
Q48	C6
Q49	D4
Q51	E3
Q401	C6
Q402	C6
Q403	C8
Q404	B8
Q405	B8
Q406	C8
Q407	C9
Q408	C9
Q409	D7
Q410	D8
Q411	D8
Q412	D6
Q413	D6
Q414	C6
Q415	D6
Q416	D8
Q417	D8
Q418	B8
Q419	B8
Q420	D7
D1	E1
D2	D2
D3	E4
D4	D4
D5	D4
D6	C2
D7	C4
D8	B4
D9	B4
D403	C8
D404	C9
D405	D7
D406	C7
D407	D8

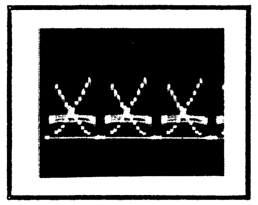
SCHEMATIC DIAGRAM OF PROCESS BOARD

< Waveforms >

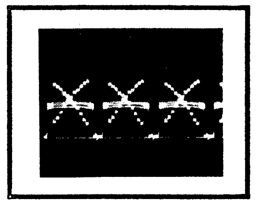
1. 0.1V/DIV, 20μsec/DIV



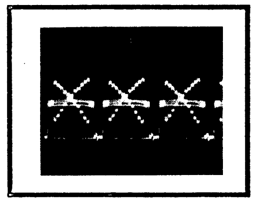
2. 0.2V/DIV, 20μsec/DIV



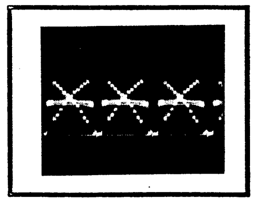
3. 0.2V/DIV, 20μsec/DIV



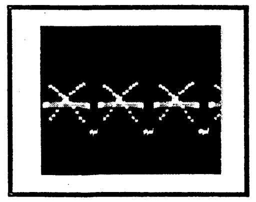
4. 0.2V/DIV, 20μsec/DIV



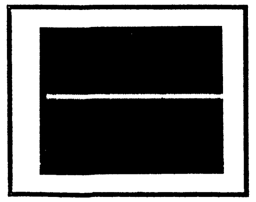
5. 0.2V/DIV, 20μsec/DIV



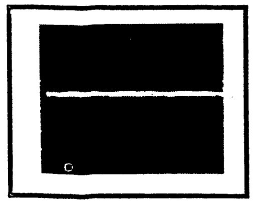
6. 0.1V/DIV, 20μsec/DIV



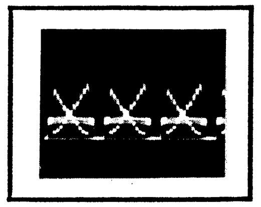
7. 20mV/DIV, 20μsec/DIV



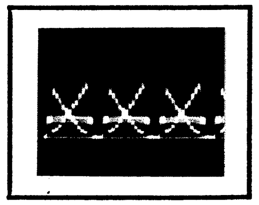
8. 20mV/DIV, 20μsec/DIV



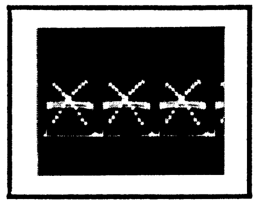
9. 0.2V/DIV, 20μsec/DIV



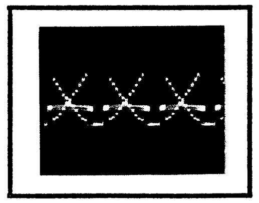
10. 0.2V/DIV, 20μsec/DIV



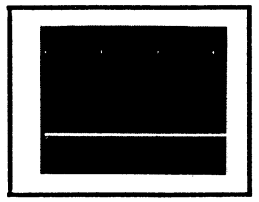
11. 0.2V/DIV, 20μsec/DIV



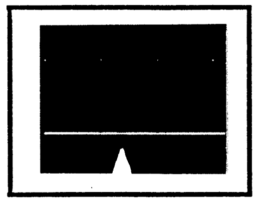
12. 0.2V/DIV, 20μsec/DIV



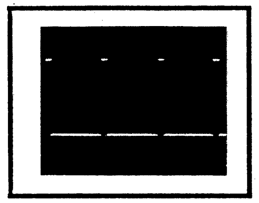
13. 1V/DIV, 20μsec/DIV



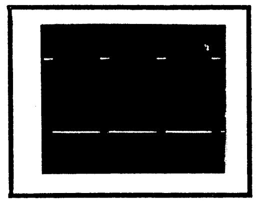
14. 2V/DIV, 20μsec/DIV



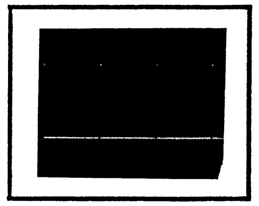
15. 2V/DIV, 20μsec/DIV



16. 2V/DIV, 20μsec/DIV



17. 2V/DIV, 20μsec/DIV



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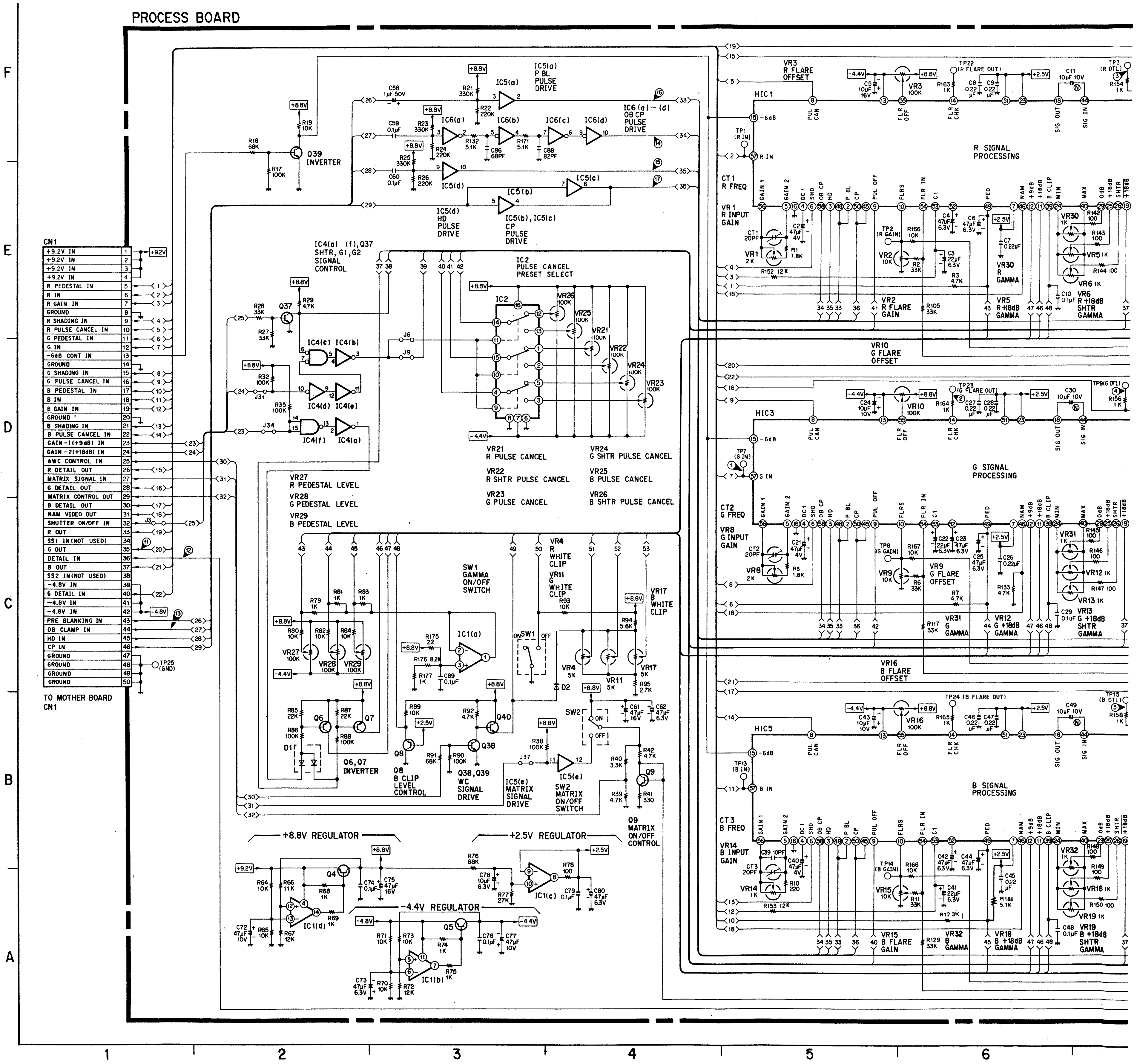
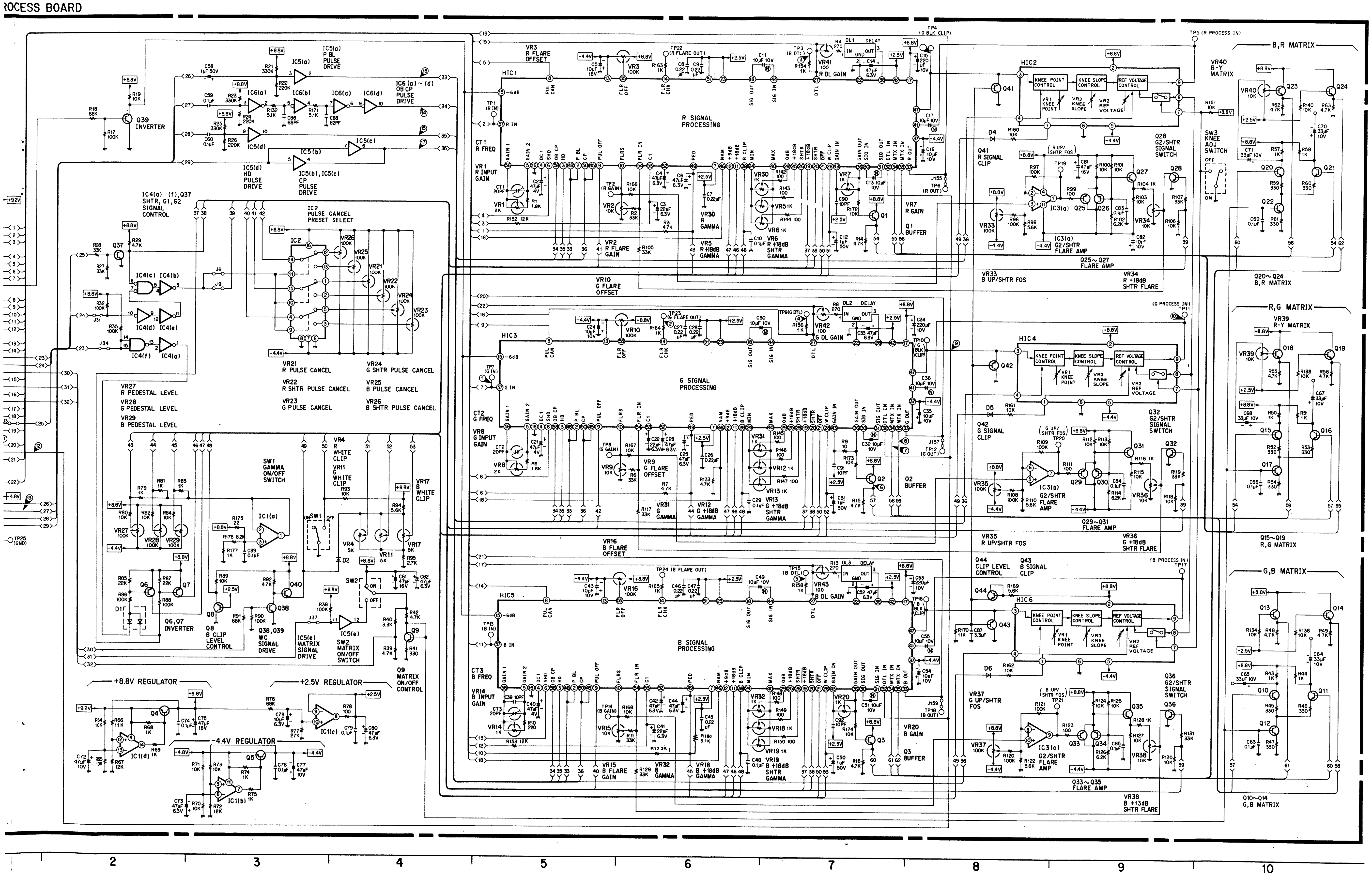
PROCESS BOARD

Ref No.	Address
HIC1	F5
IC1	A2, A3, C3
HIC2	F8
IC2	D3
HIC3	D5
IC3	A8, C8, E8
HIC4	D8
IC4	D2
HIC5	B5
IC5	B4, E3, E4, F3
HIC6	B9
IC6	F3, F4
Q1	E7
Q2	C7
Q3	A7
Q4	A3
Q5	A3
Q6	B2
Q7	B2
Q8	B3
Q9	B4
Q10	B10
Q11	B10
Q12	A10
Q13	B10
Q14	B10
Q15	C10
Q16	C10
Q17	C10
Q18	D10
Q19	D10
Q20	E10
Q21	E10
Q22	E10
Q23	F10
Q24	F10
Q25	E9
Q26	E9
Q27	E9
Q28	E9
Q29	C9
Q30	C9
Q31	C9
Q32	C9
Q33	A9
Q34	A9
Q35	A9
Q36	A9
Q37	E2
Q38	B3
Q39	F2
Q40	B3
Q41	F8
Q42	D8
Q43	B8
Q44	B8
D1	B2
D2	C4
D4	E8
D5	C8


PROCESS BOARD
F
E
D
C
B
A
1
2
3
4
5
6
CN1
+9.2V IN 1
+9.2V IN 2
+9.2V IN 3
+9.2V IN 4
R PEDESTAL IN 5
R IN 6
R GAIN IN 7
GROUND 8
R SHADING IN 9
R PULSE CANCEL IN 10
G PEDESTAL IN 11
G IN 12
-6dB CONT IN 13
GROUND 14
G SHADING IN 15
G PULSE CANCEL IN 16
B PEDESTAL IN 17
B IN 18
B GAIN IN 19
GROUND 20
B SHADING IN 21
B PULSE CANCEL IN 22
GAIN-1(+9dB) IN 23
GAIN-2(+18dB) IN 24
AWC CONTROL IN 25
R DETAIL OUT 26
MATRIX SIGNAL IN 27
G DETAIL OUT 28
MATRIX CONTROL OUT 29
B DETAIL OUT 30
NAM VIDEO OUT 31
SHUTTER ON/OFF IN 32
R OUT 33
SS1 IN(NOT USED) 34
G OUT 35
DETAIL IN 36
B OUT 37
SS2 IN(NOT USED) 38
-4.8V IN 39
G DETAIL IN 40
-4.8V IN 41
-4.8V IN 42
PRE BLANKING IN 43
OB CLAMP IN 44
HD IN 45
CP IN 46
GROUND 47
GROUND 48
GROUND 49
GROUND 50
TO MOTHER BOARD CN1
+9.2V
-4.8V
TP25 (GND)
J3
Q39 INVERTER
IC5(a) P BL PULSE DRIVE
IC6(a) ~ (d) OB CP PULSE DRIVE
IC5(d) HD PULSE DRIVE
IC5(b), IC5(c) CP PULSE DRIVE
IC4(a) (f), Q37 SHTR, G1, G2 SIGNAL CONTROL
IC2 PULSE CANCEL PRESET SELECT
VR21 R PULSE CANCEL
VR22 R SHTR PULSE CANCEL
VR23 G PULSE CANCEL
VR24 G SHTR PULSE CANCEL
VR25 B PULSE CANCEL
VR26 B SHTR PULSE CANCEL
VR27 R PEDESTAL LEVEL
VR28 G PEDESTAL LEVEL
VR29 B PEDESTAL LEVEL
SW1 GAMMA ON/OFF SWITCH
VR4 R WHITE CLIP
VR11 G WHITE CLIP
VR17 B WHITE CLIP
Q6, Q7 INVERTER
Q8 B CLIP LEVEL CONTROL
Q38, Q39 WC SIGNAL DRIVE
IC5(e) MATRIX SIGNAL DRIVE
SW2 MATRIX ON/OFF SWITCH
Q9 MATRIX ON/OFF CONTROL
+8.8V REGULATOR
+2.5V REGULATOR
-4.4V REGULATOR
IC1(a)
IC1(b)
IC1(c)
IC1(d)
Q4
Q5
HIC1
R SIGNAL PROCESSING
VR3 R FLARE OFFSET
TP22 (R FLARE OUT)
TP1 (R IN)
CT1 R FREQ
VR1 R INPUT GAIN
TP2 (R GAIN)
VR2 R FLARE GAIN
VR30 R GAMMA
VR5 R +18dB GAMMA
VR6 R +18dB SHTR GAMMA
HIC3
G SIGNAL PROCESSING
VR10 G FLARE OFFSET
TP23 (G FLARE OUT)
TP7 (G IN)
CT2 G FREQ
VR8 G INPUT GAIN
TP8 (G GAIN)
VR9 G FLARE OFFSET
VR31 G GAMMA
VR12 G +18dB GAMMA
VR13 G +18dB SHTR GAMMA
HIC5
B SIGNAL PROCESSING
VR16 B FLARE OFFSET
TP24 (B FLARE OUT)
TP13 (B IN)
CT3 B FREQ
VR14 B INPUT GAIN
TP14 (B GAIN)
VR15 B FLARE GAIN
VR32 B GAMMA
VR18 B +18dB GAMMA
VR19 B +18dB SHTR GAMMA
TP3 (R DTL)
TP9 (G DTL)
TP15 (B DTL)

SCHEMATIC DIAGRAM OF PROCESS BOARD


ROCESS BOARD
Q39 INVERTER
IC5(a) P BL PULSE DRIVE
IC6(a)~(d) OB CP PULSE DRIVE
IC5(d) HD PULSE DRIVE
IC5(b), IC5(c) CP PULSE DRIVE
IC4(a) (f), Q37 SHTR, G1, G2 SIGNAL CONTROL
IC2 PULSE CANCEL PRESET SELECT
VR21 R PULSE CANCEL
VR22 R SHTR PULSE CANCEL
VR23 G PULSE CANCEL
VR24 G SHTR PULSE CANCEL
VR25 B PULSE CANCEL
VR26 B SHTR PULSE CANCEL
VR27 R PEDESTAL LEVEL
VR28 G PEDESTAL LEVEL
VR29 B PEDESTAL LEVEL
SW1 GAMMA ON/OFF SWITCH
Q6, Q7 INVERTER
Q8 B CLIP LEVEL CONTROL
Q38, Q39 WC SIGNAL DRIVE
IC5(e) MATRIX SIGNAL DRIVE
SW2 MATRIX ON/OFF SWITCH
Q9 MATRIX ON/OFF CONTROL
VR4 R WHITE CLIP
VR11 G WHITE CLIP
VR17 B WHITE CLIP
+8.8V REGULATOR
+2.5V REGULATOR
-4.4V REGULATOR
HIC1
R SIGNAL PROCESSING
VR3 R FLARE OFFSET
CT1 R FREQ
VR1 R INPUT GAIN
VR2 R FLARE GAIN
VR30 R GAMMA
VR5 R +18dB GAMMA
VR6 R +18dB SHTR GAMMA
VR7 R GAIN
VR41 R DL GAIN
Q1 BUFFER
HIC3
G SIGNAL PROCESSING
VR10 G FLARE OFFSET
CT2 G FREQ
VR8 G INPUT GAIN
VR9 G FLARE OFFSET
VR31 G GAMMA
VR12 G +18dB GAMMA
VR13 G +18dB SHTR GAMMA
VR42 G DL GAIN
Q2 BUFFER
HIC5
B SIGNAL PROCESSING
VR16 B FLARE OFFSET
CT3 B FREQ
VR14 B INPUT GAIN
VR15 B FLARE GAIN
VR32 B GAMMA
VR18 B +18dB GAMMA
VR19 B +18dB SHTR GAMMA
VR20 B GAIN
VR43 B DL GAIN
Q3 BUFFER
HIC2
HIC4
HIC6
KNEE POINT CONTROL
KNEE SLOPE CONTROL
REF VOLTAGE CONTROL
VR1 KNEE POINT
VR3 KNEE SLOPE
VR2 REF VOLTAGE
Q41 R SIGNAL CLIP
Q42 G SIGNAL CLIP
Q43 B SIGNAL CLIP
Q44 CLIP LEVEL CONTROL
Q28 G2/SHTR SIGNAL SWITCH
Q32 G2/SHTR SIGNAL SWITCH
Q36 G2/SHTR SIGNAL SWITCH
IC3(a) G2/SHTR FLARE AMP
IC3(b) G2/SHTR FLARE AMP
IC3(c) G2/SHTR FLARE AMP
Q25~Q27 FLARE AMP
Q29~Q31 FLARE AMP
Q33~Q35 FLARE AMP
VR33 B UP/SHTR FOS
VR35 R UP/SHTR FOS
VR37 G UP/SHTR FOS
VR34 R +18dB SHTR FLARE
VR36 G +18dB SHTR FLARE
VR38 B +13dB SHTR FLARE
B,R MATRIX
VR40 B-Y MATRIX
SW3 KNEE ADJ SWITCH
Q20~Q24 B,R MATRIX
R,G MATRIX
VR39 R-Y MATRIX
Q15~Q19 R,G MATRIX
G,B MATRIX
Q10~Q14 G,B MATRIX
TP5 (R PROCESS IN)
TP11 (G PROCESS IN)
TP17 (B PROCESS IN)
TP25 (GND)
2
3
4
5
6
7
8
9
10

CONDUCTOR VIEW OF PROCESS BOARD

< Voltages >

	HIC1	HIC3	HIC5		HIC1	HIC3	HIC5
Pin 1	8.7	8.7	8.7	Pin31	5.2	5.4	5.1
2	1.8	1.8	1.8	32	2.3	2.3	2.3
3	1.0	1.0	1.0	33	2.7	2.7	2.7
4	0.5	0.5	0.5	34	1.9	1.9	1.9
5	-0.2	-0.2	-0.2	35	1.9	1.9	1.9
6	2.5	2.5	2.5	36	3.3	3.5	3.3
7	2.5	2.5	2.5	37	-4.4	-4.4	-4.4
8	2.6	2.6	2.6	38	2.6	2.8	2.6
9	2.2	2.2	3.4	39	3.1	3.1	3.1
10	0.1	0.1	0.2	40	3.4	3.4	3.4
11	-4.3	-4.3	-4.3	41	2.7	2.7	2.7
12	-4.3	-4.3	-4.3	42	2.5	2.5	2.5
13	-4.4	-4.3	-4.4	43	3.3	3.5	3.3
14	-0.3	-0.3	-0.3	44	2.9	2.9	2.9
15	0	0	-0.1	45	0.2	0.2	0.2
16	0	0	0	46	2.0	2.0	2.0
17	8.8	8.8	8.8	47	2.6	2.6	2.6
18	7.3	7.4	7.4	48	1.8	1.8	1.8
19	8.8	8.8	8.8	49	2.6	2.6	2.6
20	8.8	8.8	8.8	50	0.2	0.2	0.2
21	8.8	8.8	8.8	51	2.5	2.5	2.5
22	0	0	0	52	2.5	2.5	2.5
23	2.5	2.5	2.5	53	2.6	2.6	2.6
24	3.3	3.3	3.3	54	0	0	0
25	3.4	3.4	3.4	55	-0.1	-0.1	-0.6
26	3.4	3.4	3.4	56	-0.2	0	-0.2
27	2.8	2.8	2.8	57	0.5	0.7	0.5
28	3.3	3.3	3.3	58	0.1	0.1	0.1
29	3.4	3.4	3.4	59			
30	2.8	2.8	2.8				

	IC1	IC2	IC3	IC4	IC5	IC6
Pin 1	2.5	2.1	2.5	8.8	8.8	8.8
2	2.5	1.8	0.1	0	1.8	8.5
3	2.5	-2.2	0.1	8.4	3.5	3.5
4	9.1	2.2	8.8	0	0.2	0.1
5	-2.4	1.7	0.1	0	0.3	8.6
6	-2.4	0	0.1	8.8	0.2	8.6
7	-2.8	-4.4	2.4	8.8	0.3	0.2
8	2.3	0	2.6	0	0	0
9	2.5	8.4	0.2	0	3.6	8.6
10	2.5	8.4	0.2	8.7	1.0	0.1
11	-4.8	8.4	-4.4	8.8	9.2	0
12	4.6	4.1	0.2	0	8.3	8.8
13	4.6	3.4	0.1	0	0	0
14	5.7	3.4	7.7	9.1	0	0
15		2.2		9.1	0	8.8
16		8.8		8.8	0	0

	HIC2	HIC4	HIC6
Pin 1	0.8	0.8	0.7
2	8.8	8.8	8.8
3	0	2.6	2.6
4	0.2	0.2	0.2
5	-4.4	-4.4	-4.4
6	0	0	0
7	0	0	0
8	4.0	0	0.2
9	4.2	4.2	4.2

	B	C	E		B	C	E
Q 1	3.3	8.8	2.7	Q 23	2.5	8.8	1.9
2	3.5	8.8	2.9	24	2.5	8.8	1.9
3	3.3	8.8	2.7	25	2.5	-4.4	1.2
4	9.1	8.8	8.4	26	0.7	-4.4	1.2
5	-4.8	-4.4	-4.0	27	1.2	8.8	0.6
6	8.8	-4.3	8.8	28	0.6	0	0
7	8.8	-4.3	8.8	29	2.4	-4.4	1.2
8	2.5	0	3.1	30	0.7	-4.4	1.2
9	1.1	1.1	0.1	31	1.2	8.8	0.6
10	2.9	7.8	2.3	32	0.6	0	0
11	2.7	8.3	2.1	33	2.5	-4.4	1.2
12	1.1	2.0	0.5	34	0.7	-4.4	1.2
13	2.5	8.8	2.0	35	1.2	8.8	0.6
14	2.5	8.8	2.0	36	0.6	0	0
15	2.7	8.3	2.1	37	0	8.8	0
16	2.9	7.8	2.3	38	0.6	0.1	0
17	1.1	2.0	0.5	39	0.6	0.1	0
18	2.5	8.8	1.9	40	0.1	8.8	0.4
19	2.5	8.8	1.9	41	5.4	0	2.6
20	2.7	8.0	2.1	42	5.4	0	2.6
21	2.7	8.0	2.1	43	5.4	0	2.6
22	1.1	1.9	0.5	44	6.0	6.0	5.4

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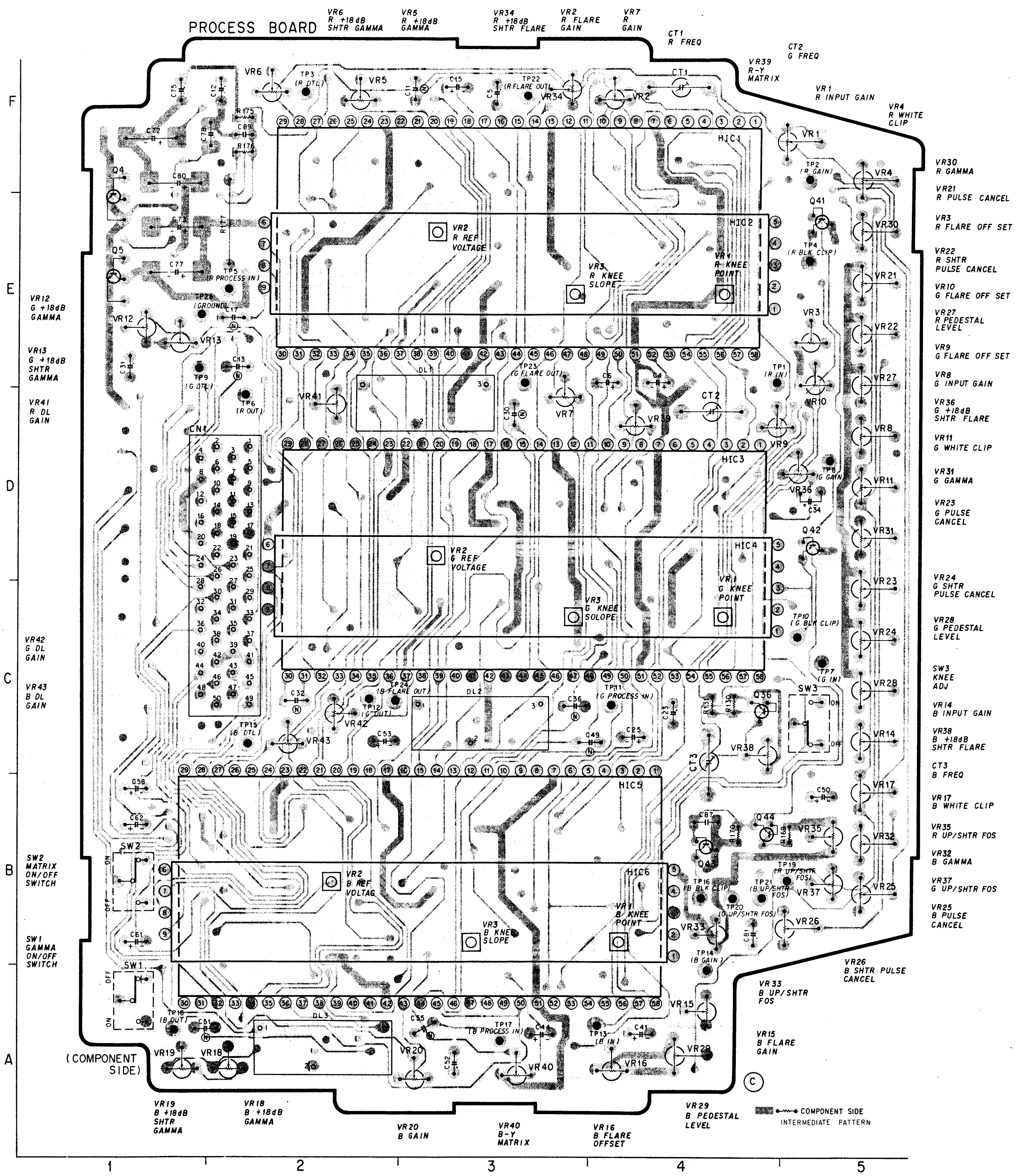
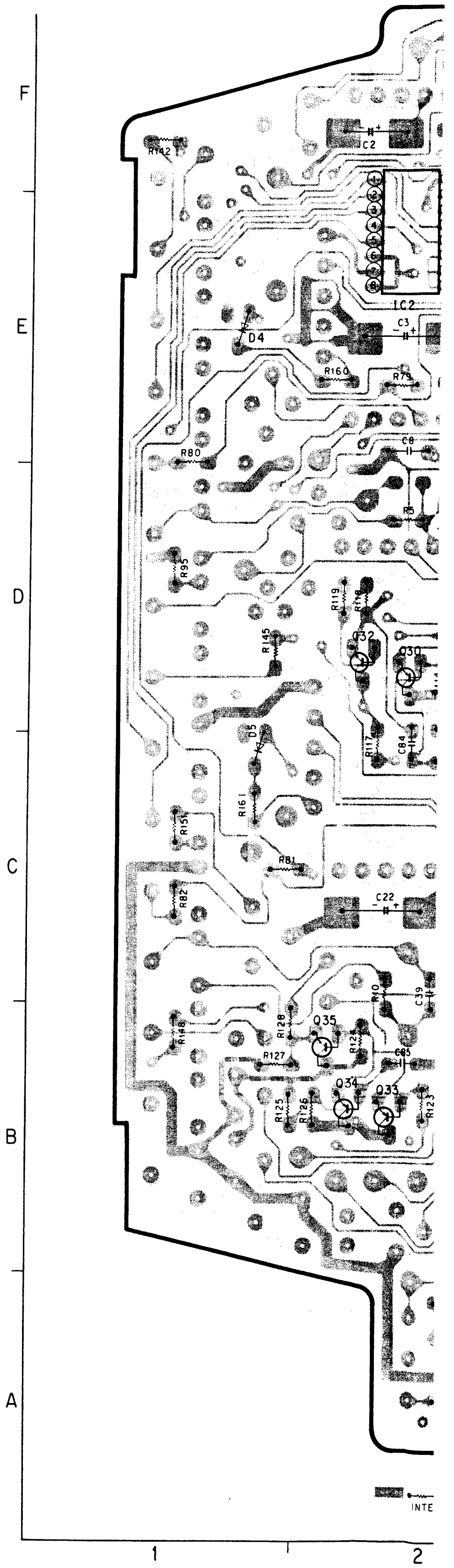
PROCESS BOARD

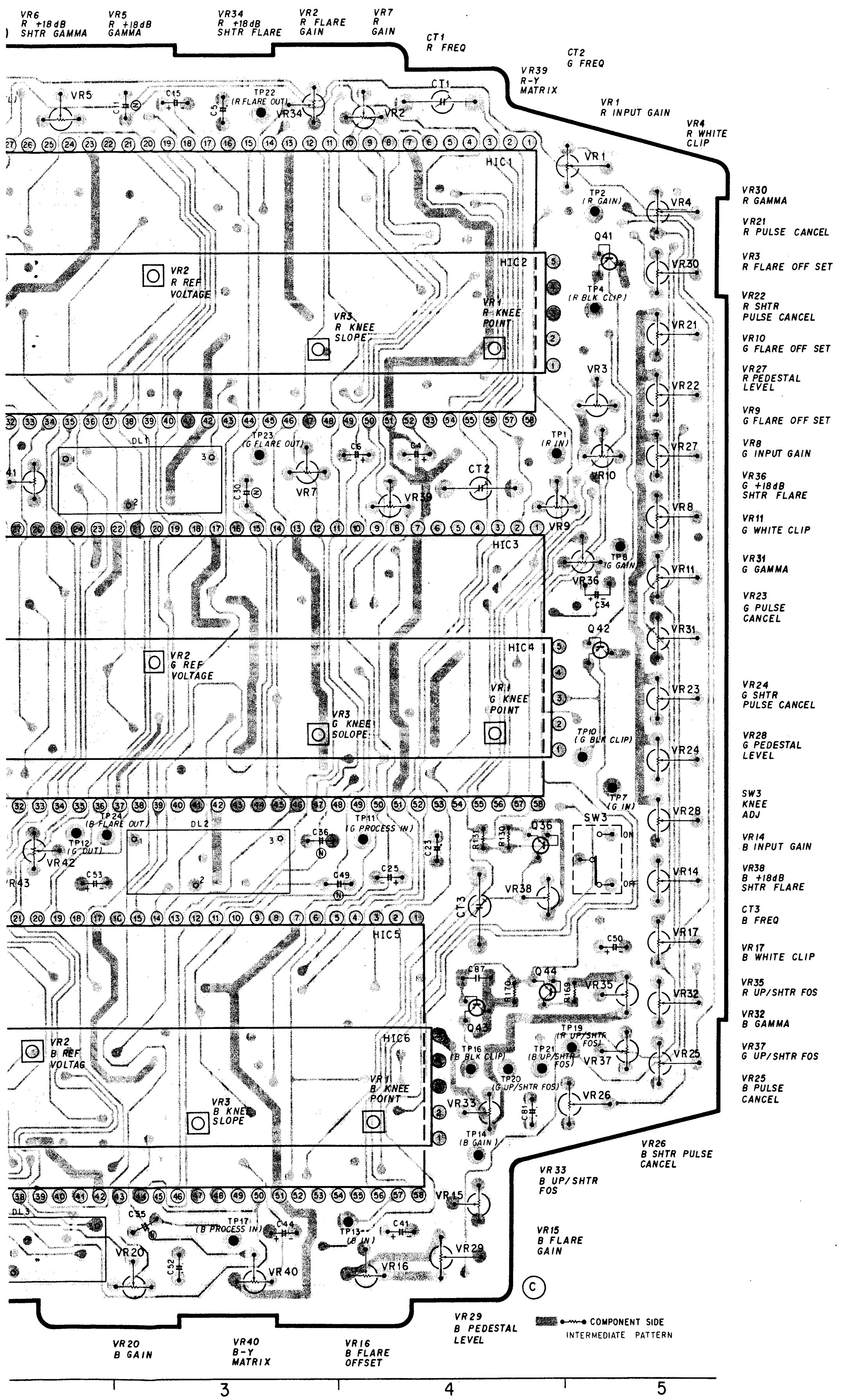
<COMPONENT SIDE>

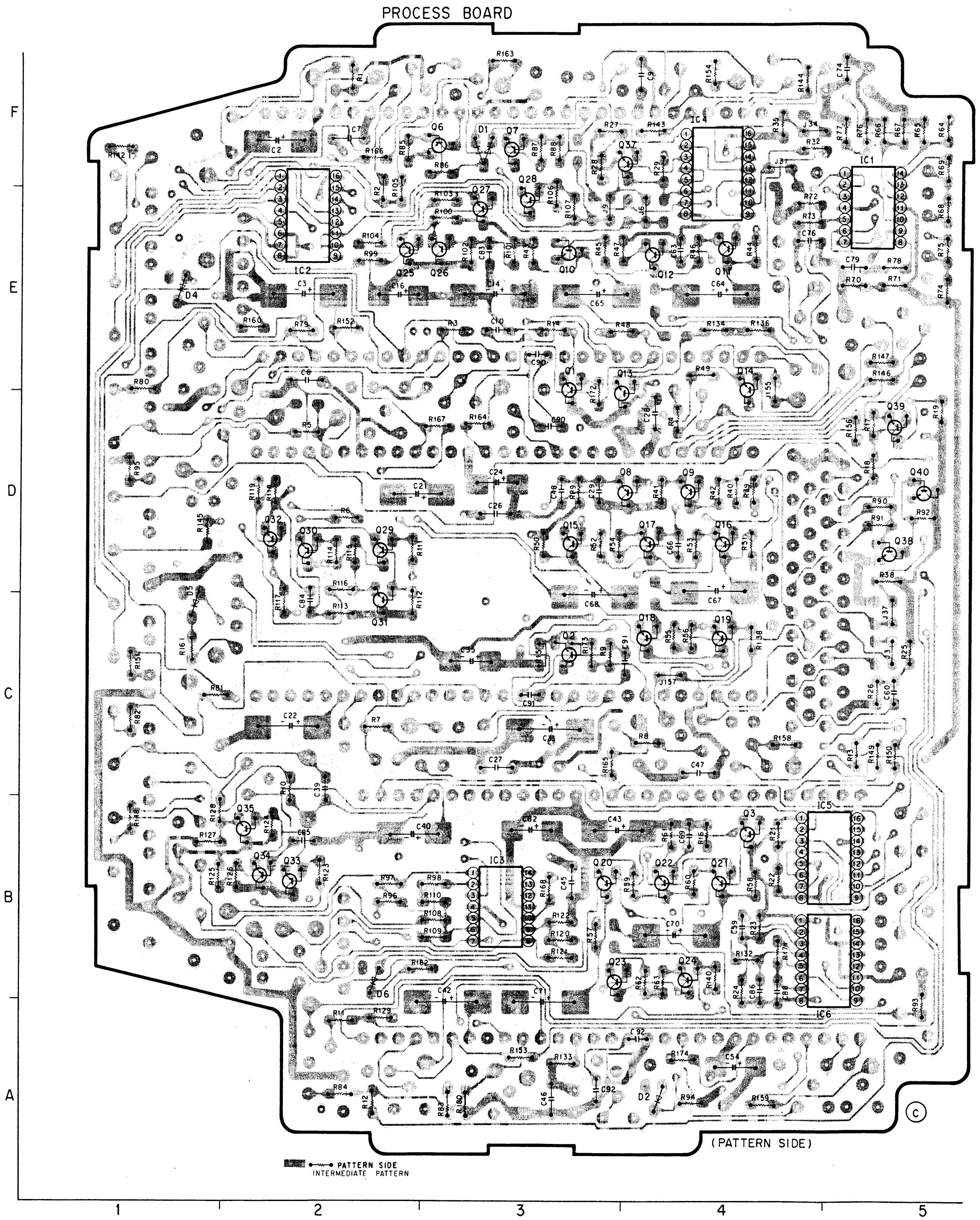
Ref No	Address
HIC1	E3
HIC2	E3
HIC3	D3
HIC4	D3
HIC5	B3
HIC6	B3
Q4	E1
Q5	E1
Q36	C4
Q41	E5
Q42	D5
Q43	B4
Q44	B4


PROCESS BOARD
VR6 R +18dB SHTR GAMMA
VR5 R +18dB GAMMA
VR34 R +18dB SHTR FLARE
VR2 R FLARE GAIN
VR7 R GAIN
CT1 R FREQ
CT2 G FREQ
VR39 R-Y MATRIX
VR1 R INPUT GAIN
VR4 R WHITE CLIP
VR30 R GAMMA
VR21 R PULSE CANCEL
VR3 R FLARE OFF SET
VR22 R SHTR PULSE CANCEL
VR10 G FLARE OFF SET
VR27 R PEDESTAL LEVEL
VR9 G FLARE OFF SET
VR8 G INPUT GAIN
VR36 G +18dB SHTR FLARE
VR11 G WHITE CLIP
VR31 G GAMMA
VR23 G PULSE CANCEL
VR24 G SHTR PULSE CANCEL
VR28 G PEDESTAL LEVEL
SW3 KNEE ADJ
VR14 B INPUT GAIN
VR38 B +18dB SHTR FLARE
CT3 B FREQ
VR17 B WHITE CLIP
VR35 R UP/SHTR FOS
VR32 B GAMMA
VR37 G UP/SHTR FOS
VR25 B PULSE CANCEL
VR26 B SHTR PULSE CANCEL
VR33 B UP/SHTR FOS
VR15 B FLARE GAIN
VR29 B PEDESTAL LEVEL
VR16 B FLARE OFFSET
VR40 B-Y MATRIX
VR20 B GAIN
VR18 B +18dB GAMMA
VR19 B +18dB SHTR GAMMA
VR12 G +18dB GAMMA
VR13 G +18dB SHTR GAMMA
VR41 R DL GAIN
VR42 G DL GAIN
VR43 B DL GAIN
SW2 MATRIX ON/OFF SWITCH
SW1 GAMMA ON/OFF SWITCH
(COMPONENT SIDE)
HIC1
HIC2
HIC3
HIC4
HIC5
HIC6
VR2 R REF VOLTAGE
VR3 R KNEE SLOPE
VR1 R KNEE POINT
VR2 G REF VOLTAGE
VR3 G KNEE SOLOPE
VR1 G KNEE POINT
VR2 B REF VOLTAG
VR3 B KNEE SLOPE
VR1 B KNEE POINT
TP3 (R DTL)
TP22 (R FLARE OUT)
TP2 (R GAIN)
TP4 (R BLK CLIP)
TP5 (R PROCESS IN)
TP28 (GROUND)
TP9 (G DTL)
TP6 (R OUT)
TP23 (G FLARE OUT)
TP1 (R IN)
TP8 (G GAIN)
TP10 (G BLK CLIP)
TP7 (G IN)
TP24 (B FLARE OUT)
TP12 (G OUT)
TP11 (G PROCESS IN)
TP15 (G DTL)
TP16 (B BLK CLIP)
TP21 (B UP/SHTR FOS)
TP19 (R UP/SHTR FOS)
TP20 (G UP/SHTR FOS)
TP14 (B GAIN)
TP18 (B OUT)
TP17 (B PROCESS IN)
TP13 (B IN)
CN1
DL1
DL2
DL3
Q4
Q5
Q36
Q41
Q42
Q43
Q44
ON
OFF
COMPONENT SIDE
INTERMEDIATE PATTERN
C
A
B
C
D
E
F
1
2
3
4
5


F
E
D
C
B
A
1
2
IC2
D4
Q32
Q30
Q35
Q34
Q33
INTE

CONDUCTOR VIEW OF PROCESS BOARD


VR6
R +18dB
SHTR GAMMA
VR5
R +18dB
GAMMA
VR34
R +18dB
SHTR FLARE
VR2
R FLARE
GAIN
VR7
R
GAIN
CT1
R FREQ
CT2
G FREQ
VR39
R-Y
MATRIX
VR1
R INPUT GAIN
VR4
R WHITE
CLIP
VR30
R GAMMA
VR21
R PULSE CANCEL
VR3
R FLARE OFF SET
VR22
R SHTR
PULSE CANCEL
VR10
G FLARE OFF SET
VR27
R PEDESTAL
LEVEL
VR9
G FLARE OFF SET
VR8
G INPUT GAIN
VR36
G +18dB
SHTR FLARE
VR11
G WHITE CLIP
VR31
G GAMMA
VR23
G PULSE
CANCEL
VR24
G SHTR
PULSE CANCEL
VR28
G PEDESTAL
LEVEL
SW3
KNEE
ADJ
VR14
B INPUT GAIN
VR38
B +18dB
SHTR FLARE
CT3
B FREQ
VR17
B WHITE CLIP
VR35
R UP/SHTR FOS
VR32
B GAMMA
VR37
G UP/SHTR FOS
VR25
B PULSE
CANCEL
VR26
B SHTR PULSE
CANCEL
VR33
B UP/SHTR
FOS
VR15
B FLARE
GAIN
VR29
B PEDESTAL
LEVEL
VR20
B GAIN
VR40
B-Y
MATRIX
VR16
B FLARE
OFFSET
HIC1
HIC2
HIC3
HIC4
HIC5
HIC6
VR2
R REF
VOLTAGE
VR3
R KNEE
SLOPE
VR1
R KNEE
POINT
VR2
G REF
VOLTAGE
VR3
G KNEE
SOLOPE
VR1
G KNEE
POINT
VR2
B REF
VOLTAG
VR3
B KNEE
SLOPE
VR1
B KNEE
POINT
TP22 (R FLARE OUT)
TP2 (R GAIN)
TP4 (R BLK CLIP)
TP23 (G FLARE OUT)
TP1 (R IN)
TP8 (G GAIN)
TP10 (G BLK CLIP)
TP7 (G IN)
TP24 (B FLARE OUT)
TP12 (G OUT)
TP11 (G PROCESS IN)
TP16 (B BLK CLIP)
TP19 (R UP/SHTR FOS)
TP21 (B UP/SHTR FOS)
TP20 (G UP/SHTR FOS)
TP14 (B GAIN)
TP17 (B PROCESS IN)
TP13 (B IN)
DL1
DL2
DL3
ON
OFF
C
COMPONENT SIDE
INTERMEDIATE PATTERN
3
4
5


PROCESS BOARD
F
E
D
C
B
A
IC1
IC2
IC3
IC4
IC5
IC6
C
(PATTERN SIDE)
PATTERN SIDE
INTERMEDIATE PATTERN
1
2
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4
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PROCESS BOARD
<PATTERN SIDE>

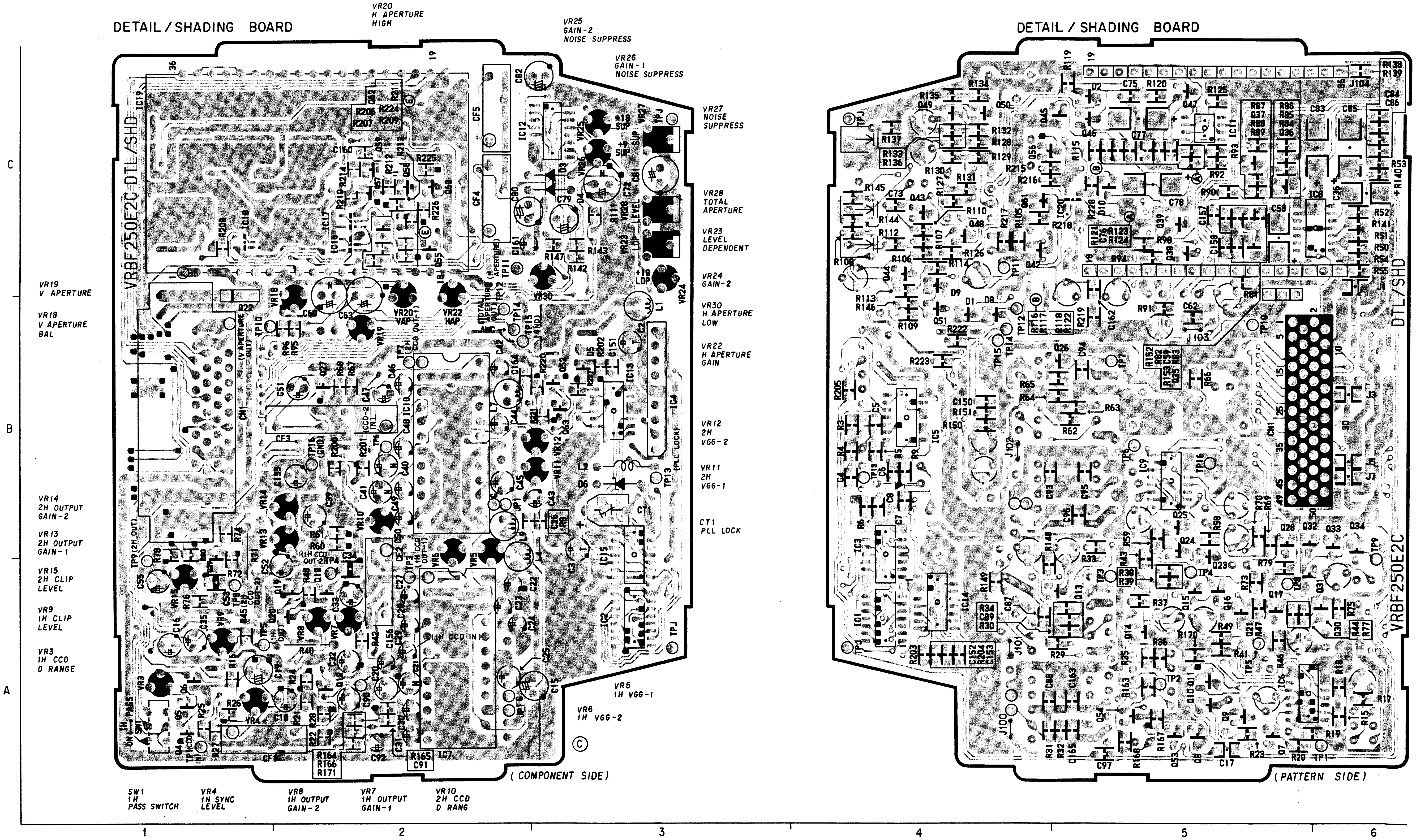
Ref No.	Address
IC1	F1
IC2	E2
IC3	B3
IC4	F4
IC5	B5
IC6	B5
Q1	E3
Q2	C3
Q3	B4
Q6	F2
Q7	F3
Q8	D3
Q9	D4
Q10	E3
Q11	E4
Q12	E4
Q13	E3
Q14	E4
Q15	D3
Q16	D4
Q17	D4
Q18	C4
Q19	C4
Q20	B3
Q21	B4
Q22	B4
Q23	B3
Q24	B4
Q25	E2
Q26	E3
Q27	E3
Q28	E3
Q29	D2
Q30	D2
Q31	C2
Q32	D2
Q33	B2
Q34	B2
Q35	B2
Q37	F3
Q38	D5
Q39	D5
Q40	D5
D1	F3
D2	A4
D4	E1
D5	C1
D6	B2

CONDUCTOR VIEW OF DETAIL/SHADING BOARD

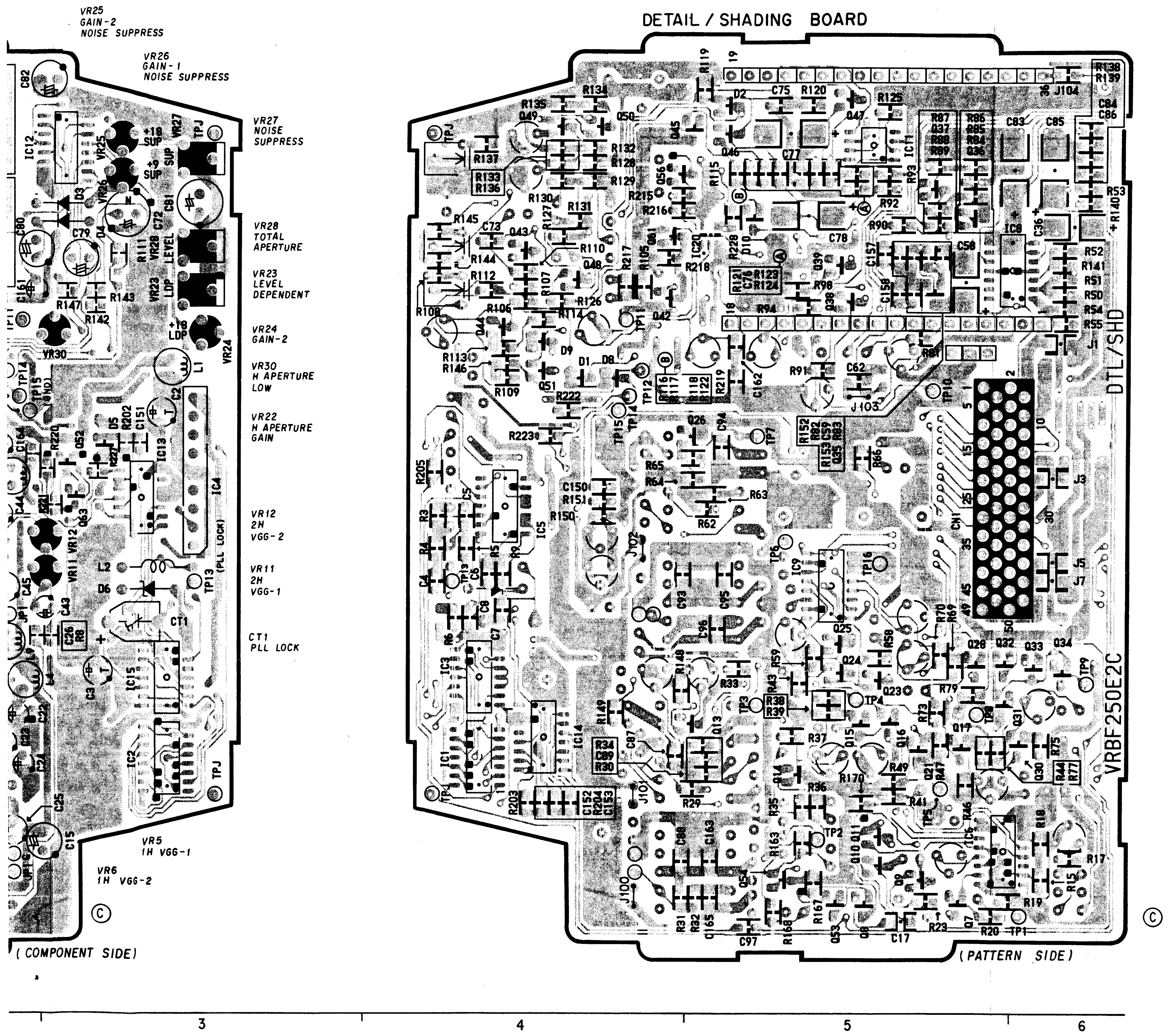
<Index>

DTL/SHD
<COMPONENT SIDE>

Ref No.	Address
IC2	A3
IC4	B3
IC7	A2
IC10	B2
IC12	C3
IC13	B3
IC15	B3
IC16	C2
IC17	C2
IC18	C1
IC19	C2
Q4	A1
Q5	A1
Q6	A1
Q12	A2
Q18	A2
Q19	A2
Q20	A2
Q22	B1
Q27	B2
Q29	A1
Q52	B3
Q55	C2
Q57	C2
Q58	C2
Q59	C2
Q60	C2
Q62	C2
Q63	B3
D3	C3
D4	C3
D5	B3
D6	B3


DETAIL / SHADING BOARD
VR20 H APERTURE HIGH
VR25 GAIN-2 NOISE SUPPRESS
VR26 GAIN-1 NOISE SUPPRESS
VR27 NOISE SUPPRESS
VR28 TOTAL APERTURE
VR23 LEVEL DEPENDENT
VR24 GAIN-2
VR30 H APERTURE LOW
VR22 H APERTURE GAIN
VR12 2H VGG-2
VR11 2H VGG-1
CT1 PLL LOCK
VR5 1H VGG-1
VR6 1H VGG-2
VR19 V APERTURE
VR18 V APERTURE BAL
VR14 2H OUTPUT GAIN-2
VR13 2H OUTPUT GAIN-1
VR15 2H CLIP LEVEL
VR9 1H CLIP LEVEL
VR3 1H CCD D RANGE
SW1 1H PASS SWITCH
VR4 1H SYNC LEVEL
VR8 1H OUTPUT GAIN-2
VR7 1H OUTPUT GAIN-1
VR10 2H CCD D RANG
VRBF250E2C DTL/SHD
(COMPONENT SIDE)
DETAIL / SHADING BOARD
DTL/SHD
VRBF250E2C
(PATTERN SIDE)
A
B
C
1
2
3
4
5
6

ONDUCTOR VIEW OF DETAIL/SHADING BOARD


VR25 GAIN-2 NOISE SUPPRESS
VR26 GAIN-1 NOISE SUPPRESS
VR27 NOISE SUPPRESS
VR28 TOTAL APERTURE
VR23 LEVEL DEPENDENT
VR24 GAIN-2
VR30 H APERTURE LOW
VR22 H APERTURE GAIN
VR12 2H VGG-2
VR11 2H VGG-1
CT1 PLL LOCK
VR5 1H VGG-1
VR6 1H VGG-2
(COMPONENT SIDE)
DETAIL / SHADING BOARD
DTL/SHD
VRBF250E2C
(PATTERN SIDE)
3
4
5
6

<Index>

DTL/SHD
<PATTERN SIDE>

Ref No.	Address
IC1	A4
IC3	B4
IC5	B4
IC6	A5
IC8	C5
IC9	B5
IC11	C5
IC14	A4
IC20	C5
Q7	A5
Q8	A5
Q9	A5
Q10	A5
Q11	A5
Q13	A5
Q14	A5
Q15	A5
Q16	A5
Q17	A5
Q21	A5
Q23	A5
Q24	B5
Q25	B5
Q26	B5
Q28	B5
Q30	A6
Q31	A5
Q32	B5
Q33	B6
Q34	B6
Q35	C5
Q36	C5
Q37	C5
Q38	C5
Q39	C5
Q42	C4
Q43	C4
Q44	C4
Q45	C5
Q46	C5
Q47	C5
Q48	C4
Q49	C4
Q50	C4
Q51	B4
Q53	A5
Q54	A5
Q56	C4
Q61	C4
D1	B4
D2	C5
D8	B4
D9	C4
D10	C5

< Voltages >

	IC1	IC2	IC3	IC4	IC5	IC6	IC8	IC9	IC11	IC12	IC13	IC14	IC15	IC16	IC17	IC18	IC20
Pin 1	1.5	0	4.9	2.8	2.2	2.9	7.8	8.8	3.2	0	0	4.9	4.9	2.3	2.3	0	3.9
2	2.3	2.2	4.2	2.3	-	2.2	4.6	0	2.5	4.4	1.5	4.9	0.4	2.3	2.3	0	1.8
3	0	1.9	0.7	2.3	-	2.1	4.6	2.1	0	0	5.0	4.9	-	0	0	0	0
4	2.3	2.3	0.7	4.9	-	2.1	9.1	2.1	6.5	0	0	4.8	4.9	8.8	8.8	8.8	0
5	2.3	1.5	4.4	4.9	-	2.1	4.4	2.1	6.5	4.4	0	0.1	0.4	8.8	8.8	8.8	8.8
6	0	0.6	4.2	-	-	0	4.4	0	8.8	0	4.9.	0	4.5				
7	0	-	0	0.6	0	0	4.4	0	2.5	0	0	4.8	0				
8	0	0	3.6	3.4	1.0	0	2.9	0	3.2	0	0.2	0	4.5				
9	2.3	-	2.2	0	3.6	8.7	2.9	8.7		9.1	-	0.1	0.4				
10	2.2	-	2.2		3.4	8.7	2.9	2.4		8.7	-	4.9	4.9				
11	-	0	4.4		1.5	2.4	0	8.7		0	-	4.9	1.0				
12	1.9	2.3	4.9		0	3.4	0.3	2.6		2.9	-	4.8	0.7				
13	-0.1	2.3	0		4.9	2.8	0.3	3.6		2.9	4.5	0.1	4..4				
14	4.9	1.7	4.9		4.9	3.4	8.1	3.6		2.9	4.9	0	4.9				
15		1.5				2.9		0.3		0		4.8					
16		4.9				8.8		8.8		8.8		4.9					

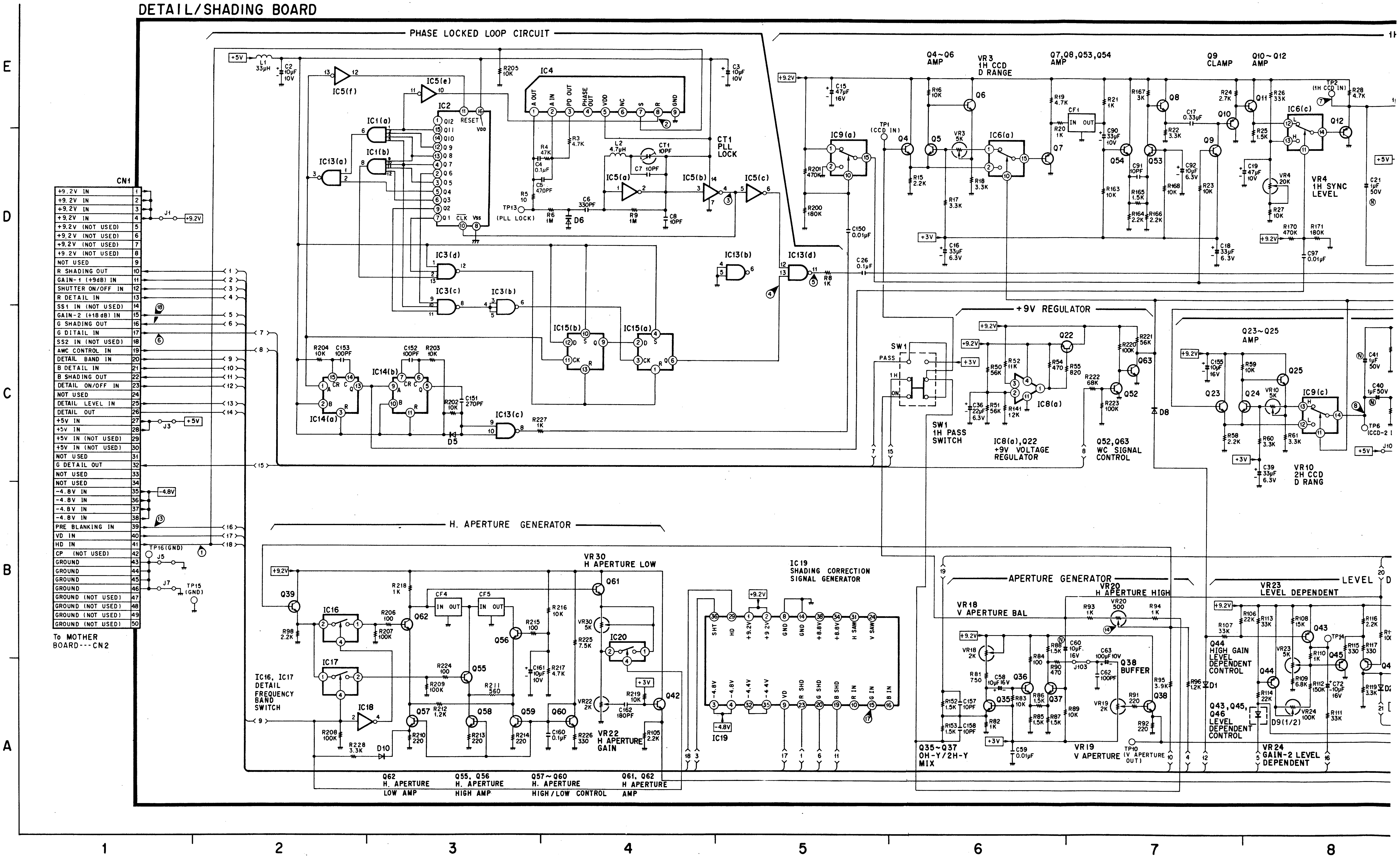
	IC7	IC10	IC19
Pin 1	3.2	3.2	9.2
2	8.7	8.7	9.2
3	0	0	-4.8
4	5.2	5.1	-4.8
5	1.7	1.7	-
6	4.6	4.6	0
7	0	0	0
8	-	-	0
9	-	-	0.2
10	5.1	5.1	-0.3
11	0	0	-
12	8.8	8.8	-
13	0	0	-
14	-	-	0
15	5.1	5.1	-0.3
16	-	-	0.3
17	-	-	-
18	0	0	-
19	4.6	4.5	2.5
20	1.6	1.6	2.5
21	5.1	5.0	-
22	0	0	-
23	8.7	8.7	2.5
24	0	0	0
25			8.6
26			8.6
27			8.6
28			8.6
29			0.6
30			-
31			0
32			-4.6
33			8.8
34			8.8
35			-4.6
36			8.8

	B	C	E
Q 4	2.8	8.8	2.2
5	2.9	3.6	2.2
6	3.6	8.8	2.9
7	2.9	0	3.5
8	6.2	8.8	5.6
9	0.2	3.4	2.9
10	3.4	0	4.0
11	4.0	8.8	3.4
12	3.4	0	4.0
13	3.2	8.8	2.6
14	2.8	8.8	2.1
15	2.7	5.1	2.1
16	5.1	8.8	4.5
17	0.2	3.2	3.0
18	3.2	8.8	2.5
19	2.9	8.7	2.5
20	8.7	2.5	8.8
21	2.5	0	3.2
22	9.2	8.8	8.4
23	3.2	8.8	2.6
24	3.3	4.3	2.6
25	4.3	8.8	3.6
26	3.2	8.8	2.6
27	2.7	8.8	2.1
28	2.8	5.1	2.1
29	5.1	8.8	4.5
30	0.2	3.2	3.0
31	3.2	8.8	2.5
32	2.9	8.7	2.5

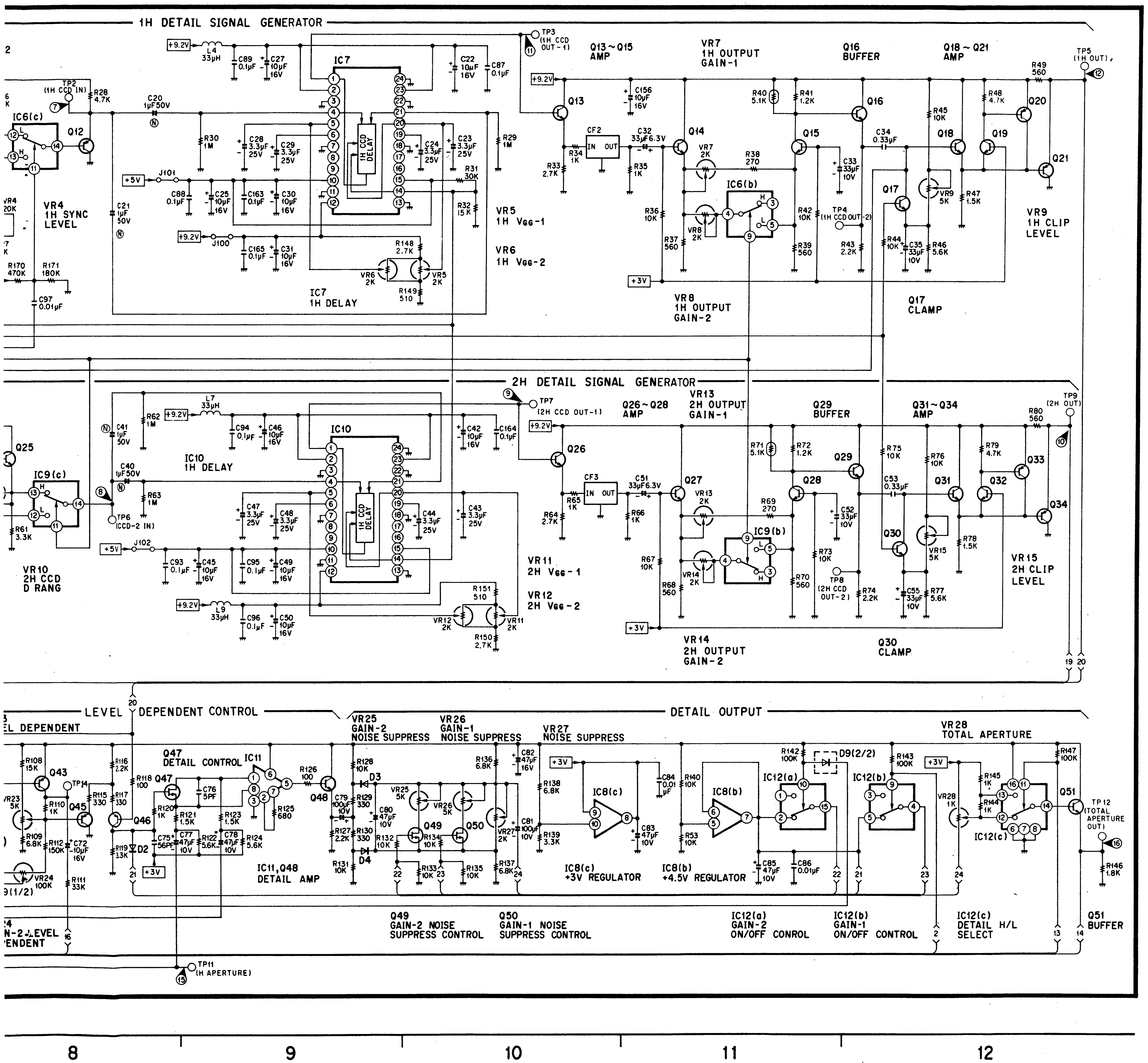
	G	D	S
Q47	3.8	3.2	3.2
49	0	3.9	4.8
50	0	3.9	4.8

	B	C	E
Q 33	8.6	2.5	8.8
34	2.5	0	3.2
35	2.9	6.3	2.3
36	2.8	8.6	2.2
37	2.8	6.5	2.2
38	2.8	8.8	2.2
39	2.9	8.8	2.3
42	2.8	8.8	2.2
43	8.1	8.8	8.8
44	8.8	7.5	8.8
45	7.7	0	4.6
46	3.3	3.9	4.0
48	6.5	8.8	5.9
51	2.9	8.8	0.6
52	0.6	0	0
53	2.8	6.2	2.1
54	2.8	8.8	2.2
55	2.2	4.4	1.6
56	7.2	4.4	1.9
57	2.4	1.9	1.8
58	2.4	1.9	1.8
59	2.4	1.9	1.8
60	2.4	2.4	1.8
61	4.5	8.8	3.9
62	2.2	4.5	1.6
63	0	8.7	0

SCHEMATIC DIAGRAM OF DETAIL/SHADING BOARD


DETAIL/SHADING BOARD
PHASE LOCKED LOOP CIRCUIT
H. APERTURE GENERATOR
APERTURE GENERATOR
+9V REGULATOR
CN1
+9.2V IN
+9.2V IN
+9.2V IN
+9.2V IN
+9.2V (NOT USED)
+9.2V (NOT USED)
+9.2V (NOT USED)
+9.2V (NOT USED)
NOT USED
R SHADING OUT
GAIN-1 (+9dB) IN
SHUTTER ON/OFF IN
R DETAIL IN
SS1 IN (NOT USED)
GAIN-2 (+18dB) IN
G SHADING OUT
G DITAIL IN
SS2 IN (NOT USED)
AWC CONTROL IN
DETAIL BAND IN
B DETAIL IN
B SHADING OUT
DETAIL ON/OFF IN
NOT USED
DETAIL LEVEL IN
DETAIL OUT
+5V IN
+5V IN
+5V IN (NOT USED)
+5V IN (NOT USED)
NOT USED
G DETAIL OUT
NOT USED
NOT USED
-4.8V IN
-4.8V IN
-4.8V IN
-4.8V IN
PRE BLANKING IN
VD IN
HD IN
CP (NOT USED)
GROUND
GROUND
GROUND
GROUND
GROUND (NOT USED)
GROUND (NOT USED)
GROUND (NOT USED)
GROUND (NOT USED)
To MOTHER BOARD---CN2
IC4
IC2
CT1 PLL LOCK
TP13 (PLL LOCK)
TP1 (CCD IN)
Q4~Q6 AMP
VR3 1H CCD D RANGE
Q7,Q8,Q53,Q54 AMP
Q9 CLAMP
Q10~Q12 AMP
TP2 (1H CCD IN)
VR4 1H SYNC LEVEL
SW1 1H PASS SWITCH
IC8(a),Q22 +9V VOLTAGE REGULATOR
Q52,Q63 WC SIGNAL CONTROL
Q23~Q25 AMP
VR10 2H CCD D RANG
TP6 (CCD-2
IC16, IC17 DETAIL FREQUENCY BAND SWITCH
VR30 H APERTURE LOW
VR22 H APERTURE GAIN
Q62 H. APERTURE LOW AMP
Q55, Q56 H. APERTURE HIGH AMP
Q57~Q60 H. APERTURE HIGH/LOW CONTROL
Q61, Q62 H APERTURE AMP
IC19 SHADING CORRECTION SIGNAL GENERATOR
VR18 V APERTURE BAL
VR20 H APERTURE HIGH
Q38 BUFFER
Q35~Q37 OH-Y/2H-Y MIX
VR19 V APERTURE
TP10 (V APERTURE OUT)
LEVEL
VR23 LEVEL DEPENDENT
Q44 HIGH GAIN LEVEL DEPENDENT CONTROL
Q43,Q45,Q46 LEVEL DEPENDENT CONTROL
VR24 GAIN-2 LEVEL DEPENDENT
TP15 (GND)
TP16 (GND)
E
D
C
B
A
1
2
3
4
5
6
7
8

ARD


1H DETAIL SIGNAL GENERATOR
IC7 1H DELAY
IC6(c)
Q12
VR4 1H SYNC LEVEL
TP2 (1H CCD IN)
TP3 (1H CCD OUT-1)
Q13~Q15 AMP
VR7 1H OUTPUT GAIN-1
Q16 BUFFER
Q18~Q21 AMP
TP5 (1H OUT)
VR5 1H VGG-1
VR6 1H VGG-2
IC6(b)
VR8 1H OUTPUT GAIN-2
TP4 (1H CCD OUT-2)
Q17 CLAMP
VR9 1H CLIP LEVEL
2H DETAIL SIGNAL GENERATOR
IC10 1H DELAY
IC9(c)
Q25
VR10 2H CCD D RANG
TP6 (CCD-2 IN)
TP7 (2H CCD OUT-1)
Q26~Q28 AMP
VR13 2H OUTPUT GAIN-1
Q29 BUFFER
Q31~Q34 AMP
TP9 (2H OUT)
VR11 2H VGG-1
VR12 2H VGG-2
IC9(b)
VR14 2H OUTPUT GAIN-2
TP8 (2H CCD OUT-2)
Q30 CLAMP
VR15 2H CLIP LEVEL
LEVEL DEPENDENT CONTROL
Q47 DETAIL CONTROL
IC11, Q48 DETAIL AMP
DETAIL OUTPUT
VR25 GAIN-2 NOISE SUPPRESS
VR26 GAIN-1 NOISE SUPPRESS
VR27 NOISE SUPPRESS
Q49 GAIN-2 NOISE SUPPRESS CONTROL
Q50 GAIN-1 NOISE SUPPRESS CONTROL
IC8(c) +3V REGULATOR
IC8(b) +4.5V REGULATOR
IC12(a) GAIN-2 ON/OFF CONROL
IC12(b) GAIN-1 ON/OFF CONTROL
VR28 TOTAL APERTURE
IC12(c) DETAIL H/L SELECT
Q51 BUFFER
TP12 (TOTAL APERTURE OUT)
TP11 (H APERTURE)
+9.2V
+5V
+3V
8
9
10
11
12

< Index >

DTL / SHD BOARD

Ref No.	Address
IC1	D3
IC2	D3
IC3	C3, D3
IC4	E4
IC5	D3, D4, D5, E2, E3
IC6	D6, D11, E8
IC7	E9
IC8	A10, A11, C6
IC9	C8, C11, D5
IC10	C9
IC11	B9
IC12	B11, B12
IC13	C3, D2, D5
IC14	C2, C3
IC15	C4
IC16	B2
IC17	A2
IC18	A2
IC19	A5
IC20	B4
Q4	D6
Q5	D6
Q6	E6
Q7	D6
Q8	E7
Q9	D7
Q10	E7
Q11	E8
Q12	E8
Q13	E10
Q14	E11
Q15	E11
Q16	E12
Q17	D12
Q18	E12
Q19	E12
Q20	E12
Q21	D12
Q22	C7
Q23	C7
Q24	C8
Q25	C8
Q26	C10
Q27	C11
Q28	C11
Q29	C12
Q30	C12
Q31	C12
Q32	C12
Q33	C12
Q34	C12
Q35	A6
Q36	A6
Q37	A6
Q38	A7
Q39	B2
Q42	A4
Q43	B8
Q44	A8
Q45	A8
Q46	A8
Q47	B8
Q48	B9
Q49	A10
Q50	A10
Q51	B12
Q52	C7
Q53	D7
Q54	D7
Q55	A3
Q56	B3
Q57	A3
Q58	A3
Q59	A3
Q60	A4
Q61	B4
Q62	B3
Q63	C7
D1	A7
D2	A8
D3	B9
D4	A9
D5	C3
D6	D4
D8	C7
D9	A8, B11
D10	A3

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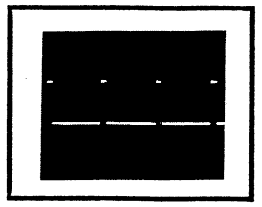
1. 2V/DIV, 20μsec/DIV



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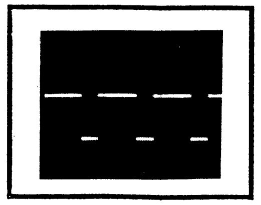
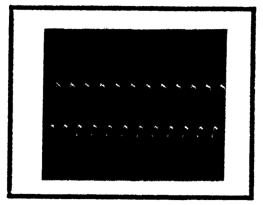


3. 2V/DIV, 50n sec/DIV



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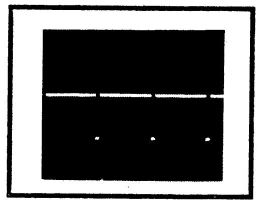

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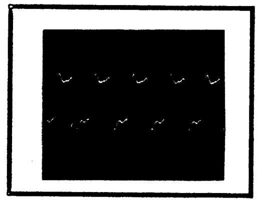
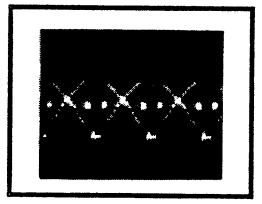


6. 0.2V/DIV, 20μsec/DIV



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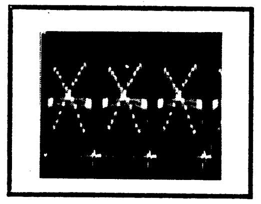
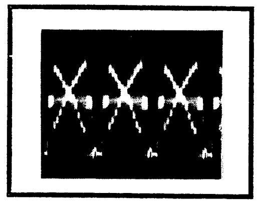


8. 0.2V/DIV, 20μsec/DIV



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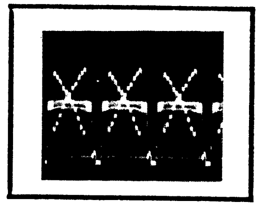

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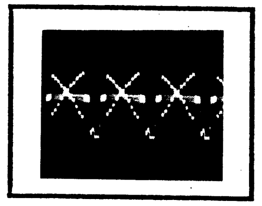
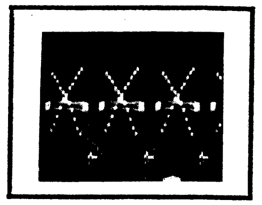


11. 0.2V/DIV, 20μsec/DIV



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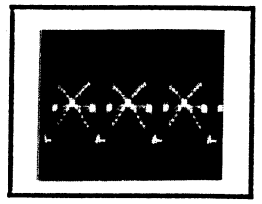
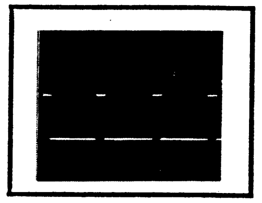
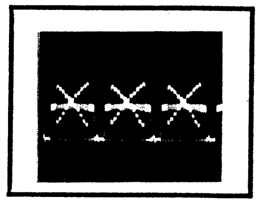


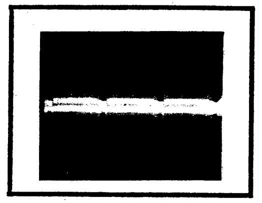
13. 2V/DIV, 20μsec/DIV



14. 0.2V/DIV, 20μsec/DIV



15. 50mV/DIV, 20μsec/DIV



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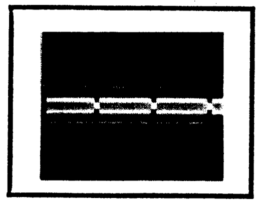
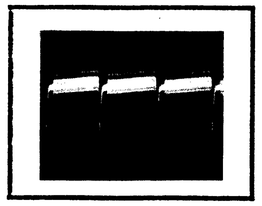
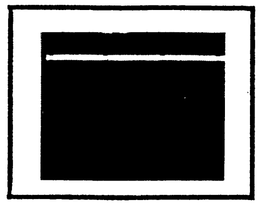


17. 50mV/DIV, 20μsec/DIV



18. 50mV/DIV, 20μsec/DIV



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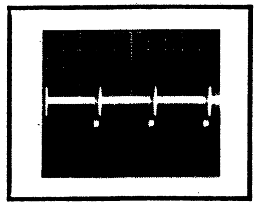
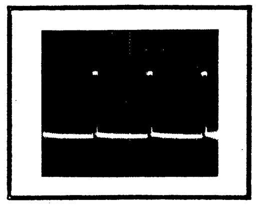
1. 0.2V/DIV, 20µsec/DIV



2. 2V/DIV, 20µsec/DIV



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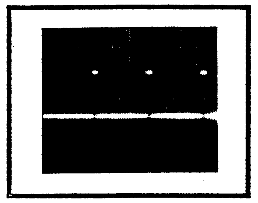

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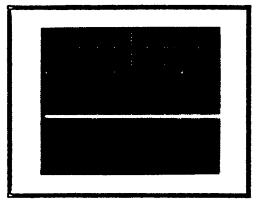

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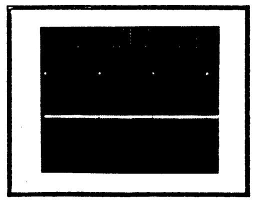

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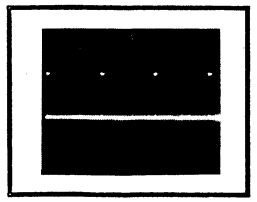
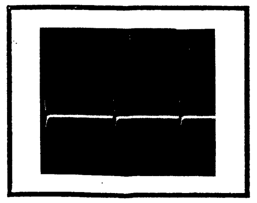
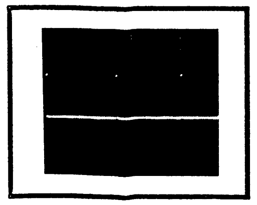


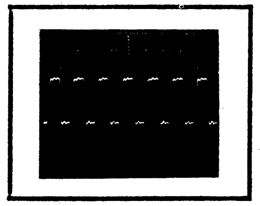
7. 2V/DIV, 5m sec/DIV



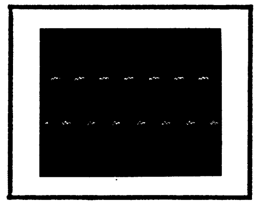
8. 2V/DIV, 5ms/DIV



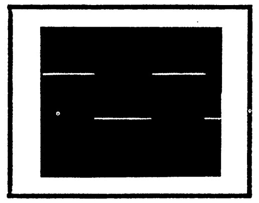
9. 2V/DIV, 50n sec/DIV



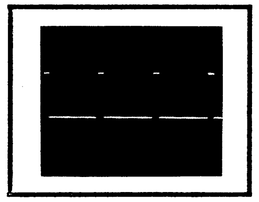
10. 2V/DIV, 20µsec/DIV



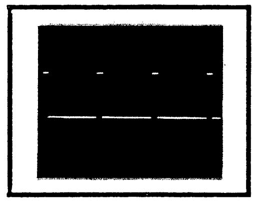
11. 2V/DIV, 20µsec/DIV



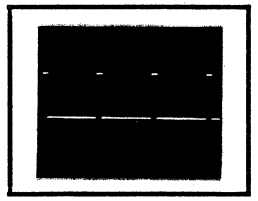
12. 0.2V/DIV, 20µsec/DIV



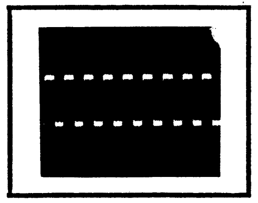
13. 0.2V/DIV, 20µsec/DIV



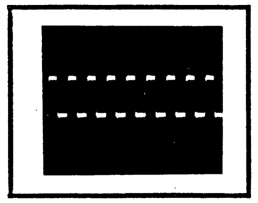
14. 0.2V/DIV, 20µsec/DIV



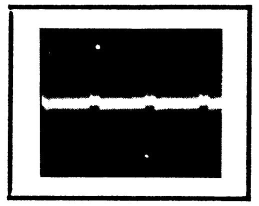
15. 0.1V/DIV, 0.2µsec/DIV



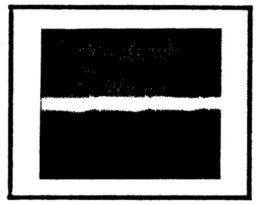
16. 0.1V/DIV, 0.2µsec/DIV



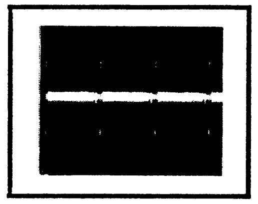
17. 20mV/DIV, 20µsec/DIV



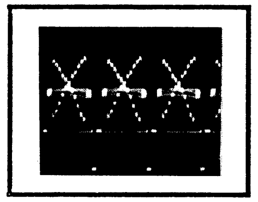
18. 20mV/DIV, 20µsec/DIV



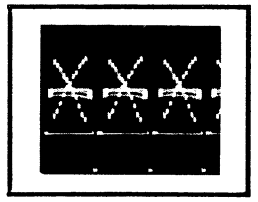
19. 0.1V/DIV, 20µsec/DIV



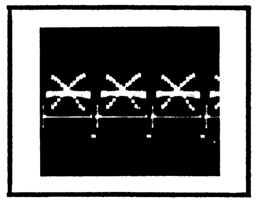
20. 0.2V/DIV, 20µsec/DIV



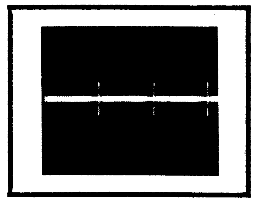
21. 0.2V/DIV, 20µsec/DIV



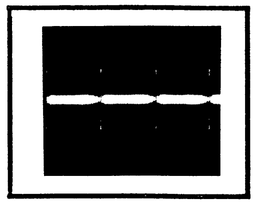
22. 0.5V/DIV, 20µsec/DIV



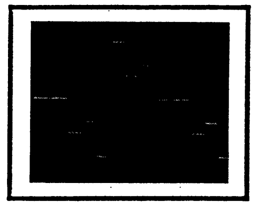
23. 0.1V/DIV, 20µsec/DIV



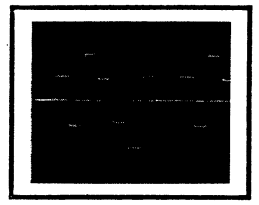
24. 0.1V/DIV, 20µsec/DIV



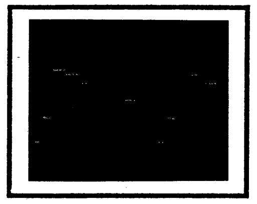
25. 0.1V/DIV, 10µsec/DIV



26. 0.1V/DIV, 10µsec/DIV

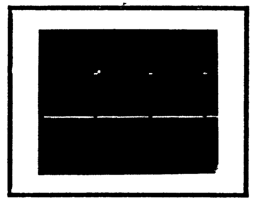


27. 0.2V/DIV, 10µsec/DIV

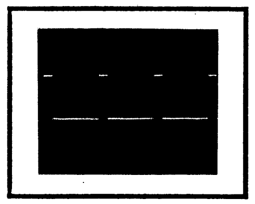


28. 0.2V/DIV, 10µsec/DIV

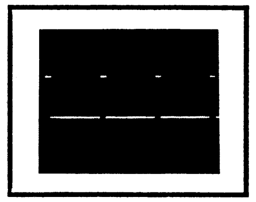
29. 2V/DIV, 20µsec/DIV



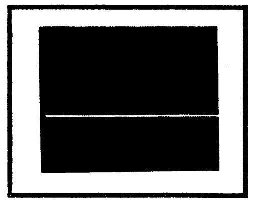
30. 2V/DIV, 20µsec/DIV



31. 2V/DIV, 20µsec/DIV



32. 2V/DIV, 5m sec/DIV



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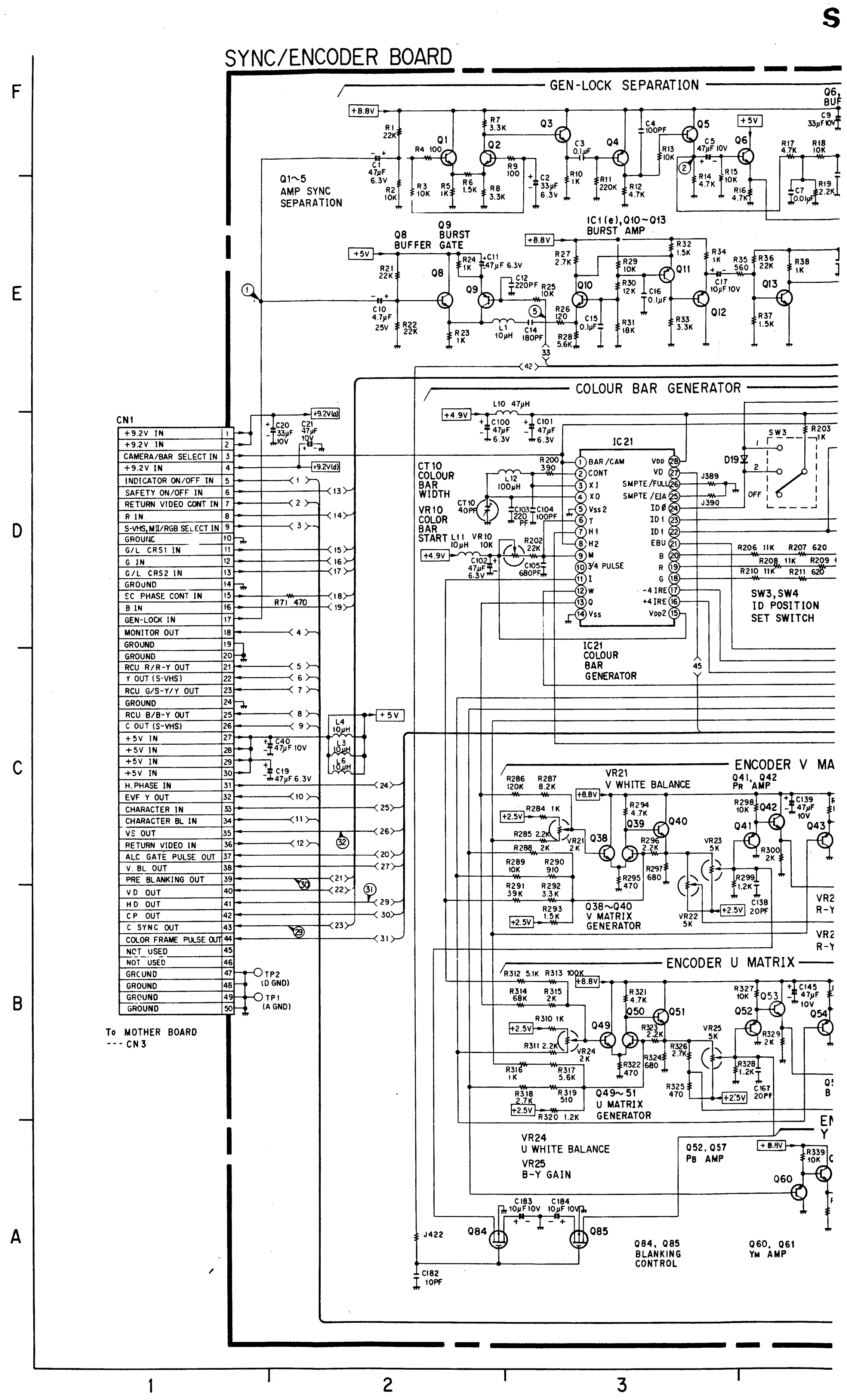
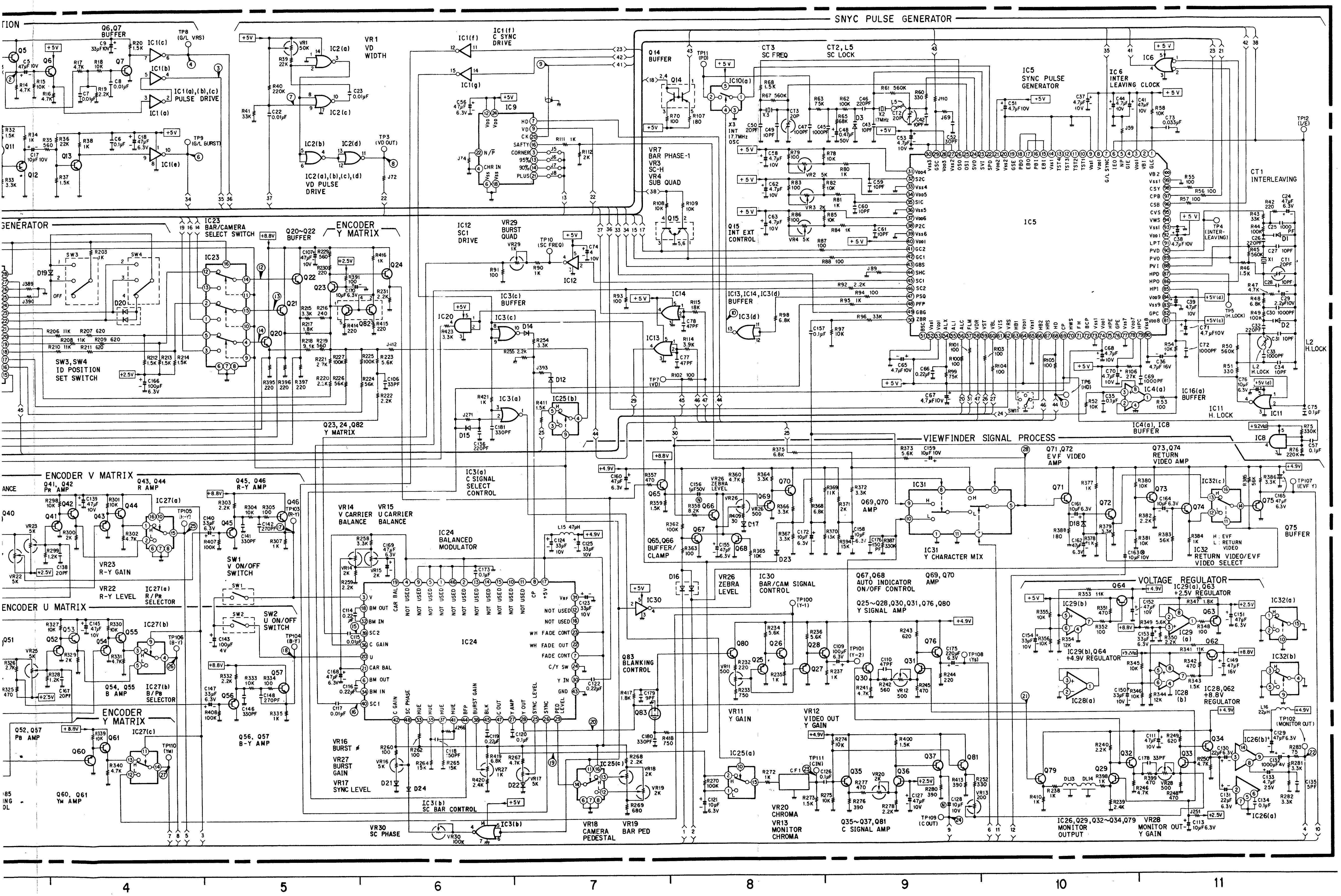
SYNC/ENCODER BOARD

Ref No.	Address
IC1	E4, F4, F6
IC2	E5, F5
IC3	A6, C6, D6, D8
IC4	C10
IC5	E10
IC6	F11
IC8	C11
IC9	E6
IC10	E8
IC11	C11
IC12	D7
IC13	D8
IC14	D7
IC20	D6
IC21	D3
IC23	D5
IC24	B6
IC25	A7, C7
IC26	A11
IC27	A4, B4, C4
IC28	B10, B11
IC29	B10, B11
IC30	B7
IC31	C9
IC32	B11
Q1	F2
Q2	F2
Q3	F3
Q4	F3
Q5	F3
Q6	F4
Q7	F4
Q8	E2
Q9	E2
Q10	E3
Q11	E3
Q12	E3
Q13	E4
Q14	E8
Q15	E8
Q20	D5
Q21	D5
Q22	D5
Q23	D5
Q24	D6
Q25	B8
Q26	B8
Q27	B8
Q28	B8
Q29	A10
Q30	B9
Q31	B9
Q32	A10
Q33	A11
Q34	A11
Q35	A9
Q36	A9
Q37	A9
Q38	C3
Q39	C3
Q40	C3
Q41	C4
Q42	C4
Q43	C4
Q44	C4
Q45	C5
Q46	C5
Q49	B3
Q50	B3
Q51	B3
Q52	B4
Q53	B4
Q54	B4
Q55	B4
Q56	B5
Q57	B5
Q60	A4
Q61	A4
Q62	B11
Q63	B11
Q64	B10
Q65	C7
Q66	C8
Q67	C8
Q68	C8
Q69	C8
Q70	C8
Q71	C10
Q72	C10
Q73	C11
Q74	C11
Q75	C11
Q76	B9
Q79	A10
Q80	B8
Q81	A9
Q82	D5
Q83	A7
Q84	A2
Q85	A3
D1	D11
D2	D11
D3	E9
D12	D7
D14	D7
D15	C6
D16	B8
D17	C8
D18	C10
D19	D4
D20	D4
D21	A6
D22	A7
D23	B8
D24	A6


S
SYNC/ENCODER BOARD
GEN-LOCK SEPARATION
Q1~5 AMP SYNC SEPARATION
Q8 BUFFER GATE
Q9 BURST
IC1(e), Q10~Q13 BURST AMP
COLOUR BAR GENERATOR
IC21
IC21 COLOUR BAR GENERATOR
CT10 COLOUR BAR WIDTH
VR10 COLOR BAR START
SW3, SW4 ID POSITION SET SWITCH
CN1
+9.2V IN
+9.2V IN
CAMERA/BAR SELECT IN
+9.2V IN
INDICATOR ON/OFF IN
SAFETY ON/OFF IN
RETURN VIDEO CONT IN
R IN
S-VHS, MII/RGB SELECT IN
GROUND
G/L CRS1 IN
G IN
G/L CRS2 IN
GROUND
SC PHASE CONT IN
B IN
GEN-LOCK IN
MONITOR OUT
GROUND
GROUND
RCU R/R-Y OUT
Y OUT (S-VHS)
RCU G/S-Y/Y OUT
GROUND
RCU B/B-Y OUT
C OUT (S-VHS)
+5V IN
+5V IN
+5V IN
+5V IN
H.PHASE IN
EVF Y OUT
CHARACTER IN
CHARACTER BL IN
VS OUT
RETURN VIDEO IN
ALC GATE PULSE OUT
V.BL OUT
PRE BLANKING OUT
VD OUT
HD OUT
CP OUT
C SYNC OUT
COLOR FRAME PULSE OUT
NOT USED
NOT USED
GROUND
GROUND
GROUND
GROUND
To MOTHER BOARD ---CN3
TP2 (D GND)
TP1 (A GND)
ENCODER V MA
VR21 V WHITE BALANCE
Q41, Q42 PR AMP
Q38~Q40 V MATRIX GENERATOR
ENCODER U MATRIX
Q49~51 U MATRIX GENERATOR
VR24 U WHITE BALANCE
VR25 B-Y GAIN
Q52, Q57 PB AMP
Q84, Q85 BLANKING CONTROL
Q60, Q61 YM AMP
F
E
D
C
B
A
1
2
3

SCHEMATIC DIAGRAM OF SYNC/ENCODER BOARD


SNYC PULSE GENERATOR
Q6,Q7 BUFFER
IC1(a),(b),(c) PULSE DRIVE
VR1 VD WIDTH
IC1(f) C SYNC DRIVE
IC2(a),(b),(c),(d) VD PULSE DRIVE
Q14 BUFFER
CT3 SC FREQ
CT2, L5 SC LOCK
IC5 SYNC PULSE GENERATOR
IC6 INTER LEAVING CLOCK
X3 INT 17.7MHz OSC
VR7 BAR PHASE-1
VR3 SC-H
VR4 SUB QUAD
Q15 INT EXT CONTROL
CT1 INTERLEAVING
IC5
L2 H.LOCK
IC11 H.LOCK
IC16(a) BUFFER
IC4(a), IC8 BUFFER
IC23 BAR/CAMERA SELECT SWITCH
Q20~Q22 BUFFER
ENCODER Y MATRIX
IC12 SC1 DRIVE
VR29 BURST QUAD
TP10 (SC FREQ)
IC3(c) BUFFER
IC13,IC14,IC3(d) BUFFER
SW3, SW4 ID POSITION SET SWITCH
Q23,24,Q82 Y MATRIX
IC3(a) C SIGNAL SELECT CONTROL
VIEWFINDER SIGNAL PROCESS
ENCODER V MATRIX
Q41, Q42 PR AMP
Q43, Q44 R AMP
Q45, Q46 R-Y AMP
VR23 R-Y GAIN
VR22 R-Y LEVEL
IC27(a) R/PR SELECTOR
SW1 V ON/OFF SWITCH
SW2 U ON/OFF SWITCH
ENCODER U MATRIX
Q54, Q55 B AMP
IC27(b) B/PB SELECTOR
Q56, Q57 B-Y AMP
ENCODER Y MATRIX
Q52, Q57 PB AMP
Q60, Q61 YM AMP
VR14 V CARRIER BALANCE
VR15 U CARRIER BALANCE
IC24 BALANCED MODULATOR
IC24
VR16 BURST
VR27 BURST GAIN
VR17 SYNC LEVEL
IC3(b) SC BAR CONTROL
VR30 SC PHASE
VR18 CAMERA PEDESTAL
VR19 BAR PED
Q65,Q66 BUFFER/CLAMP
VR26 ZEBRA LEVEL
IC30 BAR/CAM SIGNAL CONTROL
Q67,Q68 AUTO INDICATOR ON/OFF CONTROL
Q69,Q70 AMP
IC31 Y CHARACTER MIX
Q71,Q72 EVF VIDEO AMP
Q73,Q74 RETURN VIDEO AMP
IC32 RETURN VIDEO/EVF VIDEO SELECT
Q75 BUFFER
Q83 BLANKING CONTROL
Q25~Q28,Q30,Q31,Q76,Q80 Y SIGNAL AMP
VR11 Y GAIN
VR12 VIDEO OUT Y GAIN
VR20 CHROMA
VR13 MONITOR CHROMA
Q35~Q37,Q81 C SIGNAL AMP
VOLTAGE REGULATOR
IC29(a),Q63 +2.5V REGULATOR
IC29(b),Q64 +4.9V REGULATOR
IC28,Q62 +8.8V REGULATOR
IC26,Q29,Q32~Q34,Q79 MONITOR OUTPUT
VR28 MONITOR OUT Y GAIN
4
5
6
7
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10
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CONDUCTOR VIEW OF SYNC/ENCODER B

< Voltages >

	IC1	IC2	IC3	IC4	IC20	IC23	IC25	IC26	IC27	IC28	IC29	IC30	IC31	IC32
Pin 1	5.1	0	1.1	3.3	0.6	2.6	2.4	1.6	2.0	8.0	1.9	-	0	0
2	5.1	5.0	0.2	3.3	0.6	2.2	2.5	1.7	1.4	0	2.5	4.9	0.1	0
3	0	0	3.8	3.3	0	2.7	1.7	1.7	2.0	8.0	2.5	0	4.9	0
4	0	5.0	0	0	0.6	2.6	1.7	2.3	2.0	0	0	0	4.8	0
5	5.1	0	4.9	0.5	5.1	2.2	0.3	0	1.4	4.6	4.6	4.9	1.9	0
6	5.1	0	4.9	0.5		0	0	2.4	0	4.6	4.6		2.6	0
7	0.1	0	0	4.3		0	0	0	0	5.3	5.3		0	0
8	0	0	3.8	5.1		0	0	1.7	0	9.2	9.2		0	0
9	5.1	0	3.8			4.9	4.9	2.0	8.8				2.5	0
10	0	5.0	1.3			4.9	1.1	1.7	8.8				2.6	0
11	0.4	0	2.5			4.9	4.9	1.7	8.8				0	4.8
12	4.7	5.0	2.5			2.2	1.0	1.9	1.5				3.3	1.5
13	-	5.0	2.4			2.7	1.0	2.1	2.0				4.2	1.9
14	1.3	5.1	5.1			2.6	1.0	4.9	2.0				0.2	1.9
15	3.8					2.6	2.5		2.0					0
16	-					4.9	4.8		8.8					4.9

	IC21	IC24		IC21	IC24
Pin 1	4.9	0	Pin25	-	1.2
2	0.1	4.8	26	-	4.7
3	0.6	1.4	27	0.2	1.7
4	0.6	4.8	28	4.9	2.6
5	0	0	29		1.0
6	4.9	2.1	30		1.9
7	0.4	4.8	31		1.7
8	4.9	0.6	32		1.7
9	4.9	0	33		4.8
10	4.9	1.1	34		1.7
11	0	1.7	35		3.0
12	0	2.0	36		4.8
13	0	1.8	37		3.0
14	0	3.0	38		1.3
15	4.9	0.2	39		1.7
16	0	1.7	40		1.7
17	4.9	4.8	41		3.0
18	0	2.2	42		4.8
19	0	1.8	43		0
20	0	1.5	44		0.2
21	-	1.8	45		2.4
22	0	2.3	46		0
23	0	4.8	47		2.5
24	4.4	0	48		1.6

	IC5		IC5		IC5
Pin 1	5.1	Pin41	0	Pin81	5.1
2	0	42	0	82	0
3	5.1	43	0	83	0
4	5.1	44	5.1	84	5.1
5	-	45	-	85	0
6	5.0	46	-	86	-
7	0	47	2.5	87	-
8	5.1	48	0.2	88	2.4
9	0	49	0	89	-
10	5.1	50	-	90	-
11	5.1	51	2.3	91	5.1
12	5.1	52	0	92	5.1
13	5.1	53	0	93	0
14	0	54	0.5	94	0
15	0.1	55	-	95	0.1
16	2.1	56	1.5	96	1.3
17	2.1	57	0	97	1.1
18	2.2	58	0.2	98	-
19	2.2	59	0.1	99	0
20	0	60	0.4	100	5.1
21	5.1	61	0		
22	0	62	5.1		
23	4.8	63	5.1		
24	5.1	64	5.1		
25	2.5	65	0		
26	-	66	5.1		
27	0	67	0		
28	5.1	68	0.6		
29	0.4	69	0.1		
30	0	70	0.2		
31	5.1	71	0.4		
32	0.8	72	0.1		
33	0	73	0.1		
34	5.1	74	5.1		
35	0.7	75	4.7		
36	0	76	5.1		
37	5.7	77	0		
38	0.9	78	5.1		
39	0	79	0.4		
40	5.1	80	0		

	B	C	E		B	C	E
Q 1	2.7	8.8	2.0	Q42	2.0	8.8	1.4
2	2.7	6.7	2.0	43	2.0	0	2.6
3	6.7	8.8	6.0	44	2.6	8.8	2.0
4	8.1	8.7	8.8	45	1.4	0	2.1
5	8.6	8.8	7.9	46	2.0	8.8	1.4
6	0	5.1	0	49	2.3	8.8	1.5
7	0.7	0.1	0	50	2.3	2.9	1.5
8	2.6	5.1	2.4	51	2.9	8.8	2.1
9	1.8	2.4	2.5	52	1.4	0	2.0
10	3.9	7.2	3.2	53	2.0	8.8	1.4
11	6.6	3.5	7.2	54	2.0	0	2.6
12	3.5	0	4.2	55	2.6	8.8	2.0
13	0.3	5.1	0	56	1.5	0	2.1
20	2.6	8.8	2.0	57	2.1	8.8	0.2
21	2.7	8.8	2.0	60	2.0	0	2.6
22	2.6	8.8	2.0	61	2.6	8.8	0.4
23	2.5	3.7	1.7	62	9.2	8.8	8.4
24	3.7	8.8	3.0	63	1.9	0	2.5
25	1.5	0	2.1	64	4.3	4.9	5.1
26	2.1	4.9	1.5	65	3.0	8.8	2.4
27	1.5	0	2.1	66	0.1	0	0.9
28	2.1	4.9	1.5	67	0.5	0	0
29	2.5	3.4	1.8	68	0	0	0
30	3.4	4.9	2.7	69	0	0	0.6
31	2.5	3.2	1.7	70	0.6	4.9	0
32	3.4	4.9	2.7	71	1.9	4.9	1.2
33	2.5	3.3	1.7	72	2.5	4.9	2.0
34	3.3	4.9	2.7	73	2.4	4.9	1.8
35	2.3	4.9	1.7	74	2.1	4.9	1.5
36	2.5	3.2	1.9	75	1.9	0	2.6
37	3.2	4.9	2.5	76	3.2	4.9	2.5
38	2.3	8.8	1.5	79	2.6	4.9	2.0
39	2.3	3.1	1.5	80	2.6	4.9	2.0
40	3.1	8.8	2.4	81	0	4.9	1.8
41	1.4	0	2.0				

	IC7	IC8	IC11	IC12	IC13	IC14
Pin 1	5.1	3.2	0.2	-	0.6	0.2
2	-	3.2	5.0	-1.8	0.6	0.2
3	0	0	0	0	0	0
4	1.1	0.3	0	0.9	0.6	0.2
5	5.1	9.2	5.1	5.1	5.1	5.1

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
Q14	0.4	4.0	4.7	4.0	4.7
15	0	0.7	0	0.7	0
82	1.7	2.1	1.5	2.1	1.5

	G	D	S	Sub
Q83	3.8	2.6	2.6	0
84	1.3	1.4	1.4	0
85	1.3	1.4	1.4	0

	IC9
Pin 1	0
2	0
3	5.1
4	0
5	5.1
6	0
7	0.6
8	0
9	0.2
10	5.1
11	0
12	5.1
13	5.1
14	5.1
15	5.1
16	0
17	0
18	0
19	-
20	-
21	5.1
22	-
23	5.1
24	5.1

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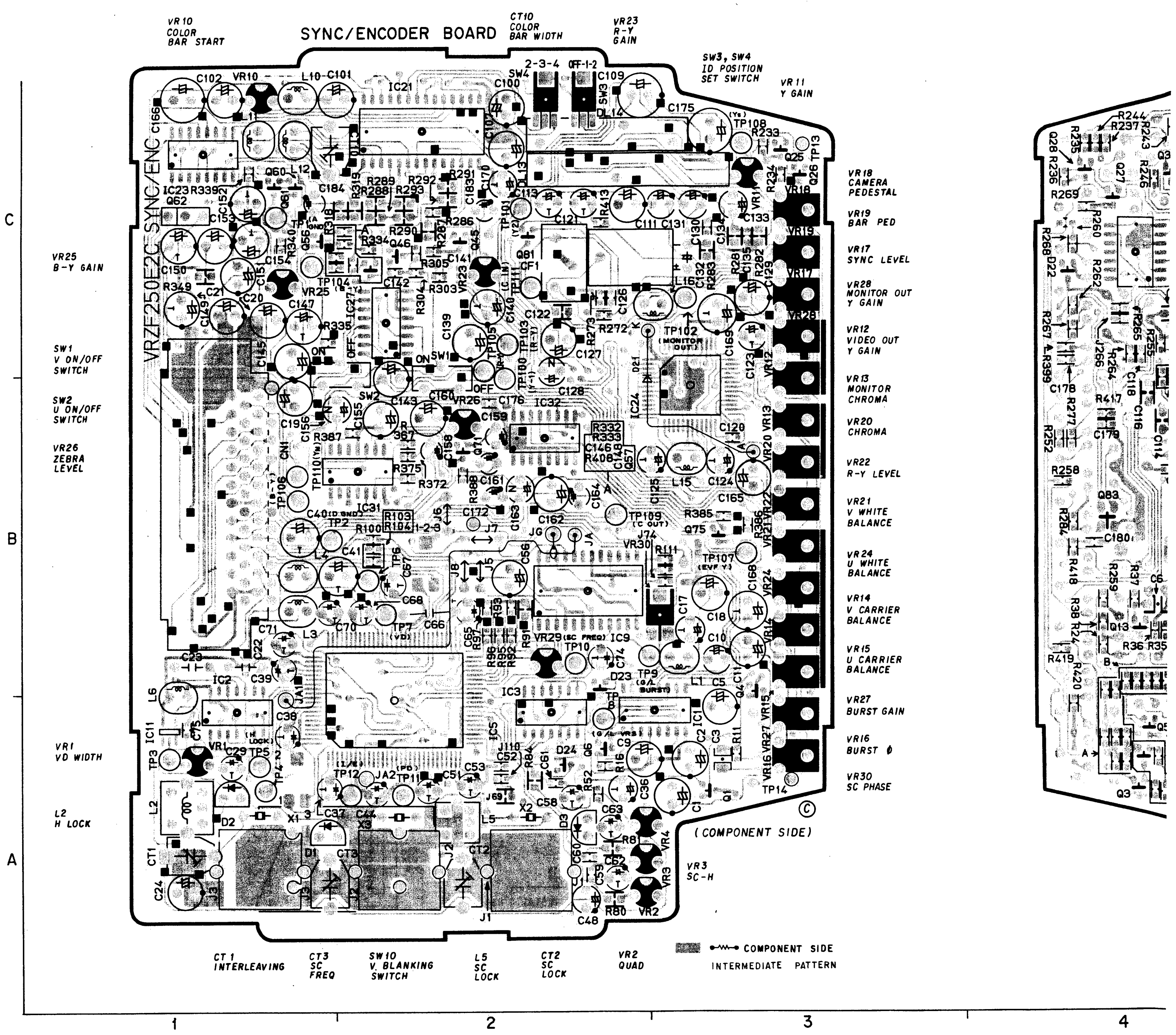
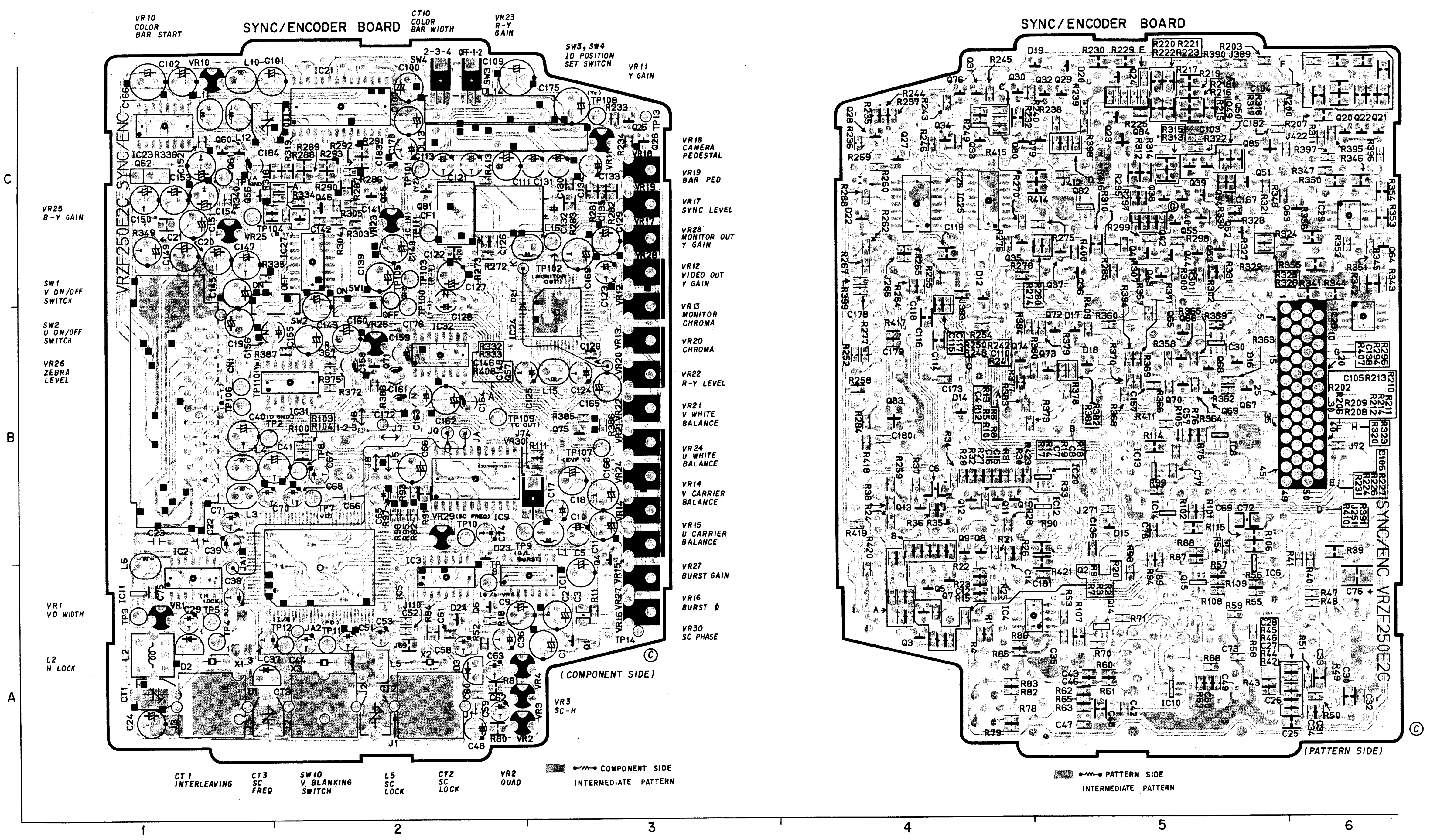
SYNC / ENCODER
<COMPONENT SIDE>

Ref No.	Address
IC1	A3
IC2	A1
IC3	A2
IC5	A2
IC9	B2
IC11	A1
IC21	C2
IC23	C1
IC24	B3
IC27	C2
IC31	B2
IC32	B2
Q1	A3
Q4	B3
Q6	A2
Q25	C3
Q26	C3
Q45	C2
Q46	C2
Q56	C1
Q57	C2
Q60	C1
Q61	C1
Q62	C1
Q71	B2
Q75	B3
Q81	C2
D1	A1
D2	A1
D3	A2
D23	B2
D24	A2


SYNC/ENCODER BOARD
VR10 COLOR BAR START
CT10 COLOR BAR WIDTH
VR23 R-Y GAIN
SW3, SW4 ID POSITION SET SWITCH
VR11 Y GAIN
VR25 B-Y GAIN
SW1 V ON/OFF SWITCH
SW2 U ON/OFF SWITCH
VR26 ZEBRA LEVEL
VR1 VD WIDTH
L2 H LOCK
VR18 CAMERA PEDESTAL
VR19 BAR PED
VR17 SYNC LEVEL
VR28 MONITOR OUT Y GAIN
VR12 VIDEO OUT Y GAIN
VR13 MONITOR CHROMA
VR20 CHROMA
VR22 R-Y LEVEL
VR21 V WHITE BALANCE
VR24 U WHITE BALANCE
VR14 V CARRIER BALANCE
VR15 U CARRIER BALANCE
VR27 BURST GAIN
VR16 BURST ϕ
VR30 SC PHASE
VR3 SC-H
(COMPONENT SIDE)
VRZF250E2C SYNC/ENC
CT1 INTERLEAVING
CT3 SC FREQ
SW10 V. BLANKING SWITCH
L5 SC LOCK
CT2 SC LOCK
VR2 QUAD
COMPONENT SIDE
INTERMEDIATE PATTERN
C
B
A
1
2
3
4

CONDUCTOR VIEW OF SYNC/ENCODER BOARD


SYNC/ENCODER BOARD
VR10 COLOR BAR START
CT10 COLOR BAR WIDTH
VR23 R-Y GAIN
SW3, SW4 ID POSITION SET SWITCH
VR11 Y GAIN
VR18 CAMERA PEDESTAL
VR19 BAR PED
VR17 SYNC LEVEL
VR28 MONITOR OUT Y GAIN
VR12 VIDEO OUT Y GAIN
VR13 MONITOR CHROMA
VR20 CHROMA
VR22 R-Y LEVEL
VR21 V WHITE BALANCE
VR24 U WHITE BALANCE
VR14 V CARRIER BALANCE
VR15 U CARRIER BALANCE
VR27 BURST GAIN
VR16 BURST ϕ
VR30 SC PHASE
VR3 SC-H
VR25 B-Y GAIN
SW1 V ON/OFF SWITCH
SW2 U ON/OFF SWITCH
VR26 ZEBRA LEVEL
VR1 VD WIDTH
L2 H LOCK
CT1 INTERLEAVING
CT3 SC FREQ
SW10 V. BLANKING SWITCH
L5 SC LOCK
CT2 SC LOCK
VR2 QUAD
(COMPONENT SIDE)
VRZF250E2C SYNC/ENC
▨ ●-w-● COMPONENT SIDE INTERMEDIATE PATTERN
SYNC/ENCODER BOARD
(PATTERN SIDE)
SYNC/ENC VRZF250E2C
▨ ●-w-● PATTERN SIDE INTERMEDIATE PATTERN
C
B
A
1
2
3
4
5
6

<Index>

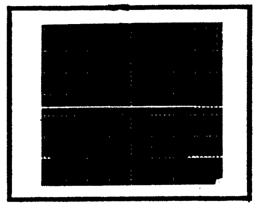
SYNC/ENCODER
<PATTERN SIDE>

Ref No.	Address		
IC4	A4	Q51	C5
IC6	A5	Q52	C5
IC8	B5	Q53	C5
IC10	A5	Q54	C5
IC12	B5	Q55	C5
IC13	B5	Q63	C6
IC14	B5	Q64	C6
IC20	B5	Q65	B5
IC25	C4	Q66	B5
IC26	C4	Q67	B5
IC28	B6	Q68	B5
IC29	C6	Q69	B5
IC30	B5	Q70	B5
Q2	A4	Q72	B5
Q3	A4	Q73	B5
Q5	A4	Q74	B4
Q7	A4	Q76	C4
Q8	B4	Q79	C5
Q9	B4	Q80	C4
Q10	B4	Q82	C5
Q11	B4	Q83	B4
Q12	B4	Q84	C5
Q13	B4	Q85	C5
Q14	A4	D12	C4
Q15	A5	D14	B4
Q20	C6	D15	B5
Q21	C6	D16	B5
Q22	C6	D17	B5
Q23	C5	D18	B5
Q24	C5	D19	C4
Q27	C4	D20	C5
Q28	C4	D22	C4
Q29	C5		
Q30	C4		
Q31	C4		
Q32	C5		
Q33	C4		
Q34	C4		
Q35	C4		
Q36	C5		
Q37	C5		
Q38	C5		
Q39	C5		
Q40	C5		
Q41	C5		
Q42	C5		
Q43	C5		
Q44	C5		
Q49	C5		
Q50	C5		

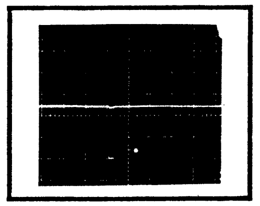
SCHEMATIC DIAGRAM OF AUTO BOARD

< Waveforms >

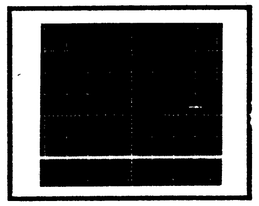
1. 2V/DIV, 20μsec/DIV



9. 2V/DIV, 5m sec/DIV



2. 2V/DIV, 20μsec/DIV



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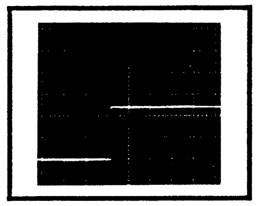

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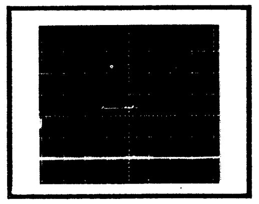
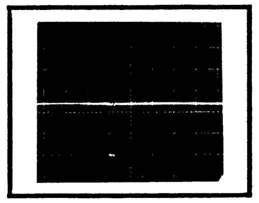
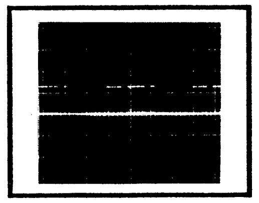


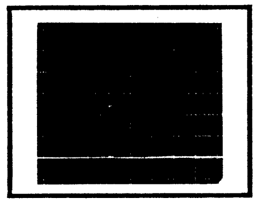
11. 2V/DIV, 5m sec/DIV



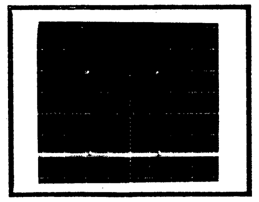
4. 0.2V/DIV, 5m sec/DIV



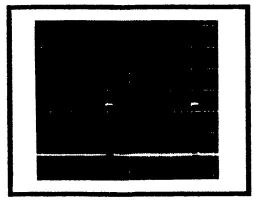
12. 2V/DIV, 5m sec/DIV



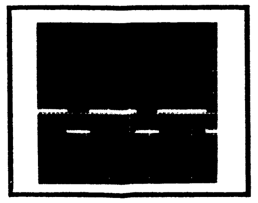
5. 2V/DIV, 20μsec/DIV



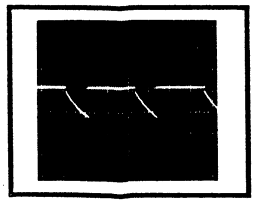
6. 2V/DIV, 5m sec/DIV



7. 0.2V/DIV, 20μsec/DIV



8. 1V/DIV, 20μsec/DIV



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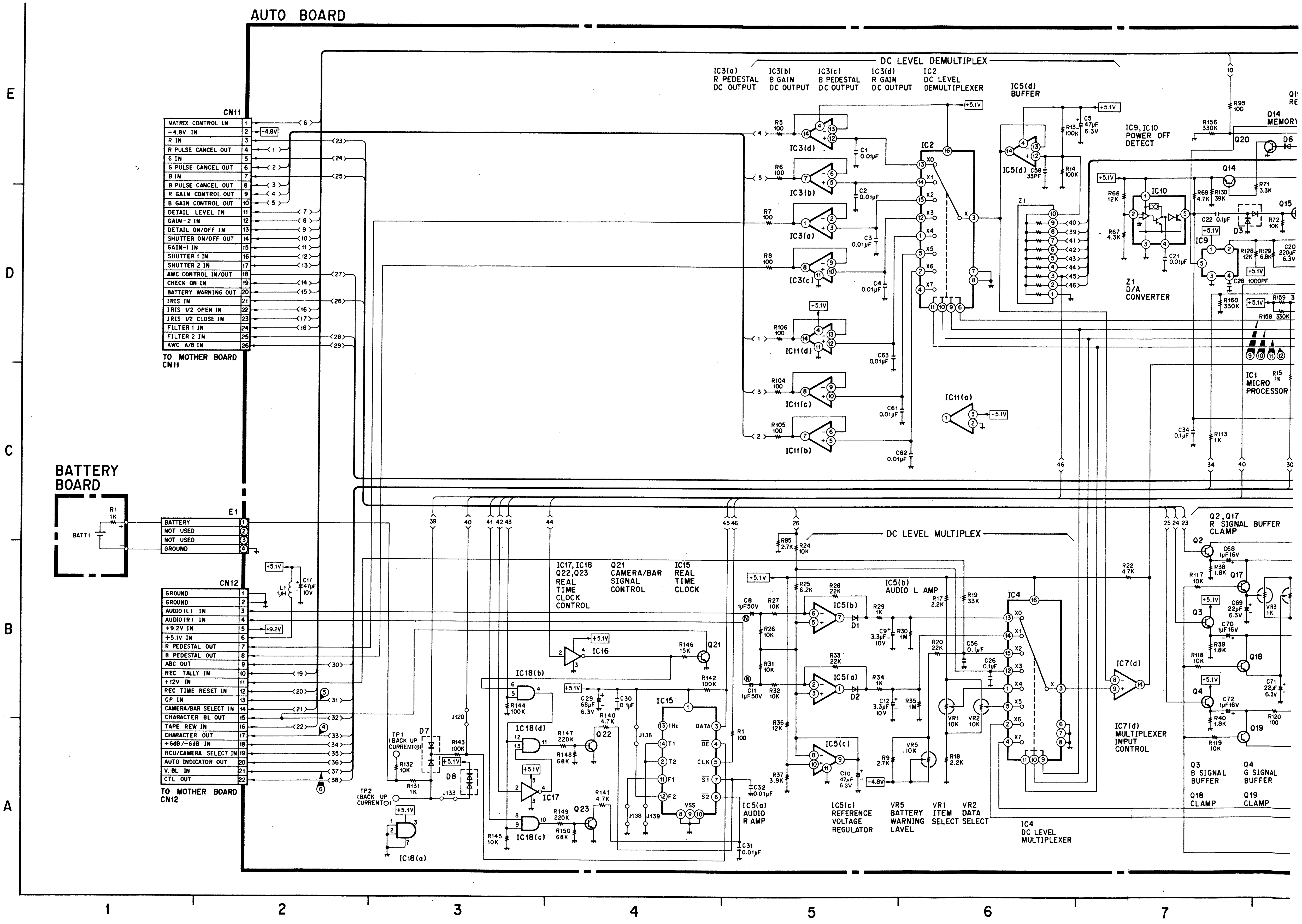
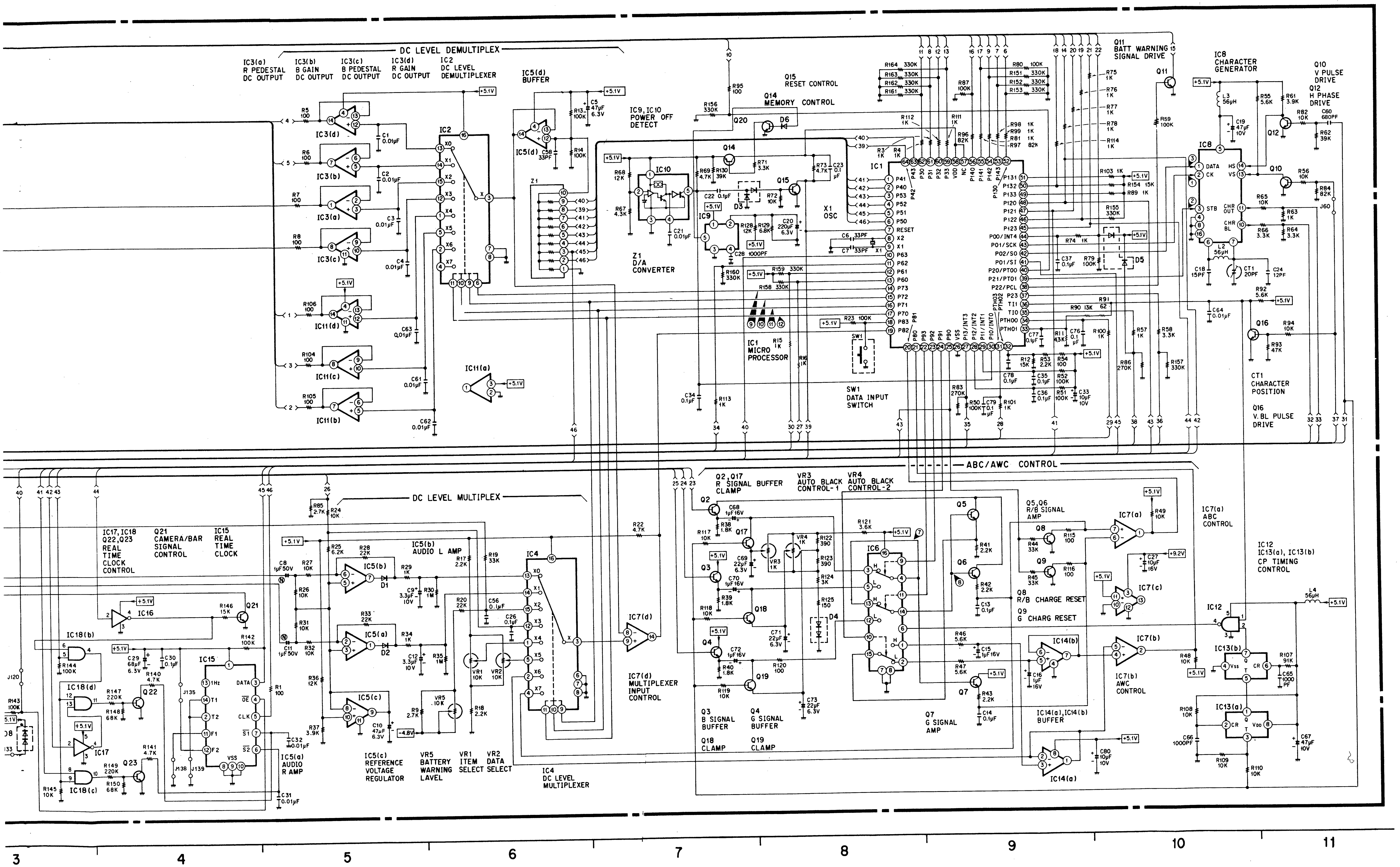
AUTO BOARD

Ref No.	Address
IC1	D9
IC2	D6
IC3	D5, E5
IC4	B6
IC5	A5, B5, E6
IC6	B8
IC7	B7, B10
IC8	B8, D10
IC9	D7
IC10	D7
IC11	C5, C6, D5, E10
IC12	B10
IC13	A10
IC14	A9, B9
IC15	A4
IC16	B4
IC17	A3
IC18	A3, B3
Q2	B7
Q3	B7
Q4	B7
Q5	B9
Q6	B9
Q7	A9
Q8	B9
Q9	B9
Q10	D11
Q11	E10
Q12	E11
Q14	E7
Q15	D8
Q16	C10
Q17	B7
Q18	B7
Q19	A7
Q20	E8
Q21	B4
Q22	A4
Q23	A4
D1	B5
D2	B5
D3	D7
D4	B8
D5	D10
D6	E8
D7	E8
D8	A3


AUTO BOARD
E
D
C
B
A
1
2
3
4
5
6
7
CN11
MATRIX CONTROL IN 1
-4.8V IN 2
R IN 3
R PULSE CANCEL OUT 4
G IN 5
G PULSE CANCEL OUT 6
B IN 7
B PULSE CANCEL OUT 8
R GAIN CONTROL OUT 9
B GAIN CONTROL OUT 10
DETAIL LEVEL IN 11
GAIN-2 IN 12
DETAIL ON/OFF IN 13
SHUTTER ON/OFF OUT 14
GAIN-1 IN 15
SHUTTER 1 IN 16
SHUTTER 2 IN 17
AWC CONTROL IN/OUT 18
CHECK ON IN 19
BATTERY WARNING OUT 20
IRIS IN 21
IRIS 1/2 OPEN IN 22
IRIS 1/2 CLOSE IN 23
FILTER 1 IN 24
FILTER 2 IN 25
AWC A/B IN 26
TO MOTHER BOARD CN11
BATTERY BOARD
R1 1K
BATT1
E1
BATTERY 1
NOT USED 2
NOT USED 3
GROUND 4
CN12
GROUND 1
GROUND 2
AUDIO(L) IN 3
AUDIO(R) IN 4
+9.2V IN 5
+5.1V IN 6
R PEDESTAL OUT 7
B PEDESTAL OUT 8
ABC OUT 9
REC TALLY IN 10
+12V IN 11
REC TIME RESET IN 12
CP IN 13
CAMERA/BAR SELECT IN 14
CHARACTER BL OUT 15
TAPE REW IN 16
CHARACTER OUT 17
+6dB/-6dB IN 18
RCU/CAMERA SELECT IN 19
AUTO INDICATOR OUT 20
V. BL IN 21
CTL OUT 22
TO MOTHER BOARD CN12
L1 1μH
C17 47μF 10V
+5.1V
+9.2V
-4.8V
DC LEVEL DEMULTIPLEX
IC3(a) R PEDESTAL DC OUTPUT
IC3(b) B GAIN DC OUTPUT
IC3(c) B PEDESTAL DC OUTPUT
IC3(d) R GAIN DC OUTPUT
IC2 DC LEVEL DEMULTIPLEXER
IC5(d) BUFFER
IC9, IC10 POWER OFF DETECT
Q14 MEMORY
Z1 D/A CONVERTER
IC1 MICRO PROCESSOR
IC11(a)
IC11(b)
IC11(c)
IC11(d)
DC LEVEL MULTIPLEX
IC17, IC18 Q22, Q23 REAL TIME CLOCK CONTROL
Q21 CAMERA/BAR SIGNAL CONTROL
IC15 REAL TIME CLOCK
IC5(b) AUDIO L AMP
IC5(a) AUDIO R AMP
IC5(c) REFERENCE VOLTAGE REGULATOR
VR5 BATTERY WARNING LAVEL
VR1 ITEM SELECT
VR2 DATA SELECT
IC4 DC LEVEL MULTIPLEXER
IC7(d) MULTIPLEXER INPUT CONTROL
Q2, Q17 R SIGNAL BUFFER CLAMP
Q3 B SIGNAL BUFFER
Q4 G SIGNAL BUFFER
Q18 CLAMP
Q19 CLAMP
IC16
IC17
IC18(a)
IC18(b)
IC18(c)
IC18(d)
TP1 (BACK UP CURRENT⊕)
TP2 (BACK UP CURRENT⊖)
D7
D8
J120
J133
J135
J138
J139
Q20
D6
D3
D1
D2

SCHEMATIC DIAGRAM OF AUTO BOARD



DC LEVEL DEMULTIPLEX
IC3(a) R PEDESTAL DC OUTPUT
IC3(b) B GAIN DC OUTPUT
IC3(c) B PEDESTAL DC OUTPUT
IC3(d) R GAIN DC OUTPUT
IC2 DC LEVEL DEMULTIPLEXER
IC5(d) BUFFER
IC9, IC10 POWER OFF DETECT
Z1 D/A CONVERTER
Q15 RESET CONTROL
Q14 MEMORY CONTROL
X1 OSC
IC1 MICRO PROCESSOR
SW1 DATA INPUT SWITCH
Q11 BATT WARNING SIGNAL DRIVE
IC8 CHARACTER GENERATOR
Q10 V PULSE DRIVE
Q12 H PHASE DRIVE
CT1 CHARACTER POSITION
Q16 V. BL PULSE DRIVE
ABC/AWC CONTROL
DC LEVEL MULTIPLEX
IC17, IC18 Q22, Q23 REAL TIME CLOCK CONTROL
Q21 CAMERA/BAR SIGNAL CONTROL
IC15 REAL TIME CLOCK
IC5(b) AUDIO L AMP
IC5(a) AUDIO R AMP
IC5(c) REFERENCE VOLTAGE REGULATOR
VR5 BATTERY WARNING LAVEL
VR1 ITEM SELECT
VR2 DATA SELECT
IC4 DC LEVEL MULTIPLEXER
IC7(d) MULTIPLEXER INPUT CONTROL
Q2, Q17 R SIGNAL BUFFER CLAMP
VR3 AUTO BLACK CONTROL-1
VR4 AUTO BLACK CONTROL-2
Q3 B SIGNAL BUFFER
Q18 CLAMP
Q4 G SIGNAL BUFFER
Q19 CLAMP
Q7 G SIGNAL AMP
Q5, Q6 R/B SIGNAL AMP
Q8 R/B CHARGE RESET
Q9 G CHARG RESET
IC7(a) ABC CONTROL
IC7(b) AWC CONTROL
IC14(a), IC14(b) BUFFER
IC12 IC13(a), IC13(b) CP TIMING CONTROL
3
4
5
6
7
8
9
10
11

CONDUCTOR VIEW OF AUTO BOARD

< Voltages >

	IC1		IC1
Pin 1	1.7	Pin33	1.0
2	1.7	34	1.6
3	0.2	35	0
4	1.1	36	3.9
5	2.8	37	0
6	4.8	38	0
7	5.0	39	0
8	2.6	40	0
9	2.3	41	5.0
10	5.0	42	0.1
11	4.7	43	4.9
12	5.1	44	0
13	4.1	45	5.0
14	4.8	46	0
15	2.7	47	0
16	4.4	48	5.1
17	0.6	49	5.1
18	5.0	50	1.2
19	0.4	51	5.1
20	0.1	52	4.8
21	0.1	53	0
22	0	54	0
23	0	55	4.8
24	0	56	4.8
25	0	57	5.0
26	0	58	5.0
27	5.5	59	4.5
28	5.0	60	0
29	5.0	61	3.7
30	5.1	62	0.2
31	2.8	63	4.1
32	4.4	64	0

	B	C	E
Q 2	2.6	5.1	2.0
3	2.6	5.1	2.0
4	2.6	5.1	2.0
5	3.0	5.1	2.3
6	3.1	5.1	3.1
7	3.3	5.1	3.2
8	0.1	3.2	0
9	0	3.2	0
10	0.1	4.9	0
11	0	9.1	0
12	-0.6	4.8	0
14	4.3	5.0	5.1
15	0	5.0	0
16	0.1	4.7	0
17	0.2	3.4	3.1
18	0.2	3.4	3.1
19	0.2	3.4	3.1
20	0.7	0	0
21	0	0	0
22	0	2.0	0
23	0	2.1	0

	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC12	IC13	IC14	IC15	IC16	IC17	IC18
Pin 1	2.3	2.6	3.0	1.5	0.4	0	0.1	5.1	5.1	4.4	4.7	0.3	0.8	2.1	-	-	0
2	2.3	2.6	0.8	1.3	2.8	0	4.9	1.8	1.3	0	3.4	0.7	0.8	0	4.9	5.1	0
3	2.5	2.3	1.3	1.3	3.4	9.2	0	0	0	5.1	0	0.1	0.4	5.0	0	0	0
4	0.1	5.1	3.2	5.1	3.3	2.8	0	1.2	1.2	5.1	1.9	0	0	5.0	0		0
5	2.3	2.3	3.1	1.3	3.4	0.8	5.1	1.2	5.1	2.3	5.1	0.3	2.8	2.7	5.1		0
6	4.8	2.6	0	1.3	1.9	3.2	2.6			2.6		0.9	2.8	2.1	0		0
7	0	2.6	0	1.5	0	3.2	2.6			2.6		3.4	2.8	2.1	5.1		0
8	0	2.5	0	1.3	0	2.5	0			2.6		5.1	5.1	0			0
9	2.7	2.5	2.7	1.3	0	1.3	0			2.6				0			0
10	4.4	2.3	4.4	1.3	0	0	0			2.3				0			0
11	0.6	0	0.6	0	0	5.1	0			0				2.1			0
12	2.3	2.3	3.1	2.5	3.4	0	0			2.3				0			0
13	2.3	2.6	1.2	2.5	3.3	0	4.7			2.6				-			0
14	2.3	2.6	1.2	2.5	3.1	0.2	4.8			2.6				0			5.1
15	2.4		1.8		2.3		2.4										
16	5.1		5.1		5.1		0										

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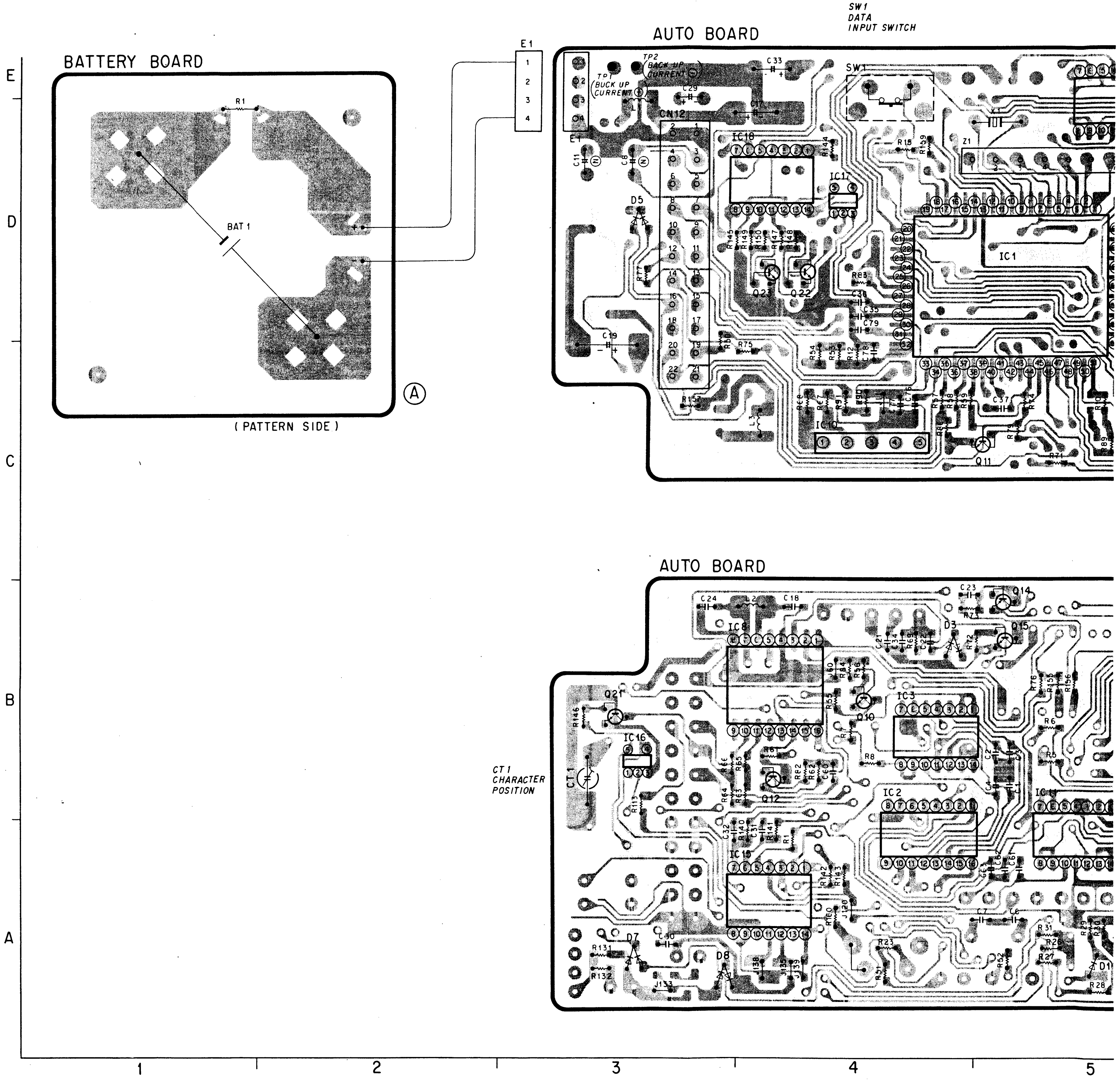
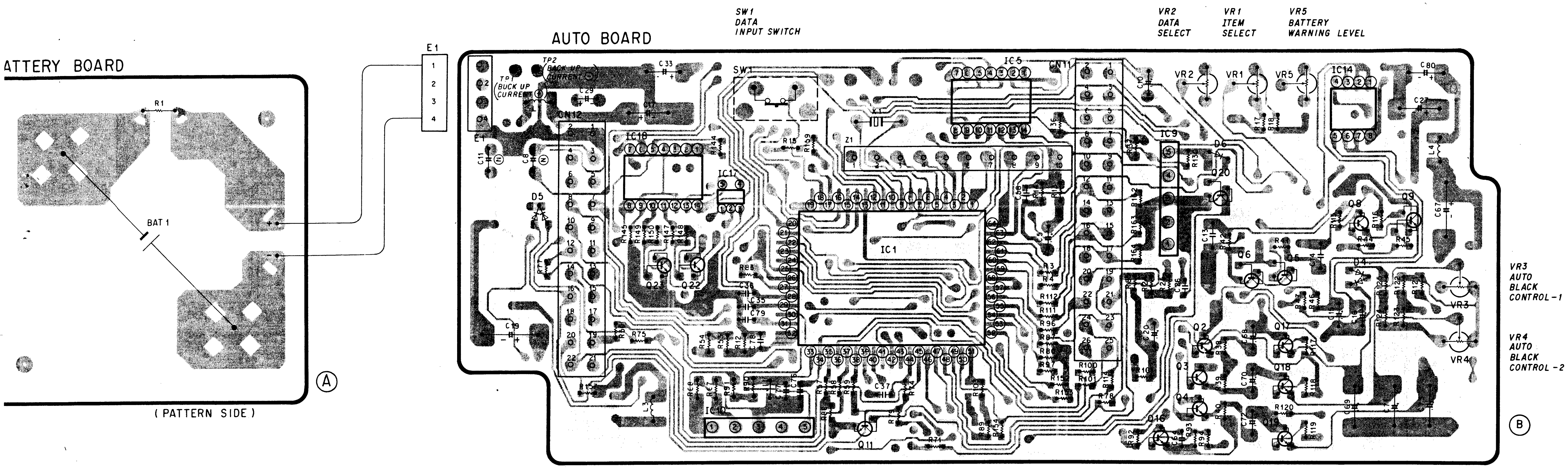
AUTO BOARD

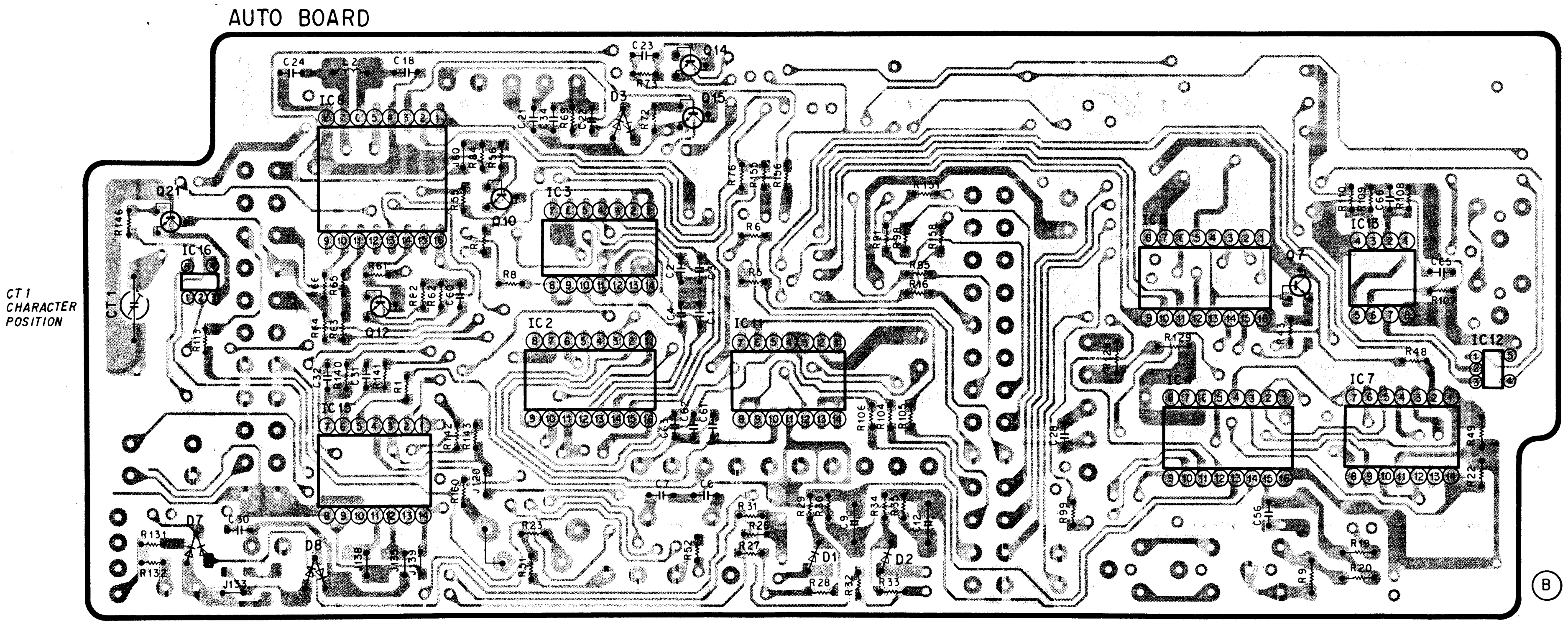
Ref No.	Address		
IC1	D5	Q15	B5
IC2	A4	Q16	C6
IC3	B4	Q17	C6
IC4	A6	Q18	C6
IC5	D5	Q19	C6
IC6	B6	Q20	D6
IC7	A7	Q21	B3
IC8	B4	Q22	D4
IC9	D6	Q23	D4
IC10	C4	D1	A5
IC11	A5	D2	A5
IC12	A7	D3	B4
IC13	B7	D4	D7
IC14	D7	D5	D3
IC15	A4	D6	D6
IC16	B3	D7	A3
IC17	D4	D8	A3
IC18	D4		
Q2	C6		
Q3	C6		
Q4	C6		
Q5	D6		
Q6	D6		
Q7	B7		
Q8	D7		
Q9	D7		
Q10	B4		
Q11	C5		
Q12	B4		
Q14	B5		


BATTERY BOARD
R1
BAT 1
Ⓐ
(PATTERN SIDE)
E1
1
2
3
4
AUTO BOARD
SW1
DATA
INPUT SWITCH
TP1
BUCK UP
CURRENT
TP2
BACK UP
CURRENT
CN12
IC18
IC17
IC1
IC10
D5
Q23
Q22
Q11
C33
C29
C19
C35
C79
C37
R75
R83
AUTO BOARD
IC8
IC3
IC2
IC15
IC16
Q21
Q10
Q12
Q14
Q15
D3
D7
D8
D1
C24
C18
C23
C40
CT1
CHARACTER
POSITION
E
D
C
B
A
1
2
3
4
5

CONDUCTOR VIEW OF AUTO BOARD


SW1
DATA
INPUT SWITCH
VR2
DATA
SELECT
VR1
ITEM
SELECT
VR5
BATTERY
WARNING LEVEL
AUTO BOARD
BATTERY BOARD
E1
R1
BAT 1
(PATTERN SIDE)
Ⓐ
TP1
BUCK UP
CURRENT
TP2
BACK UP
CURRENT
CN12
CN11
IC1
IC5
IC9
IC10
IC14
IC17
IC18
Q2
Q3
Q4
Q6
Q8
Q9
Q11
Q16
Q17
Q18
Q19
Q20
Q22
D4
D5
D6
VR3
AUTO
BLACK
CONTROL-1
VR4
AUTO
BLACK
CONTROL-2
Ⓑ
(COMPONENT SIDE)

COMPONENT SIDE
INTERMEDIATE PATTERN


AUTO BOARD
CT1
CHARACTER
POSITION
IC2
IC3
IC4
IC6
IC7
IC8
IC11
IC12
IC13
IC15
IC16
Q7
Q10
Q12
Q14
Q15
Q21
D1
D2
D3
D7
D8
Ⓑ
(PATTERN SIDE)

COMPONENT SIDE
INTERMEDIATE PATTERN

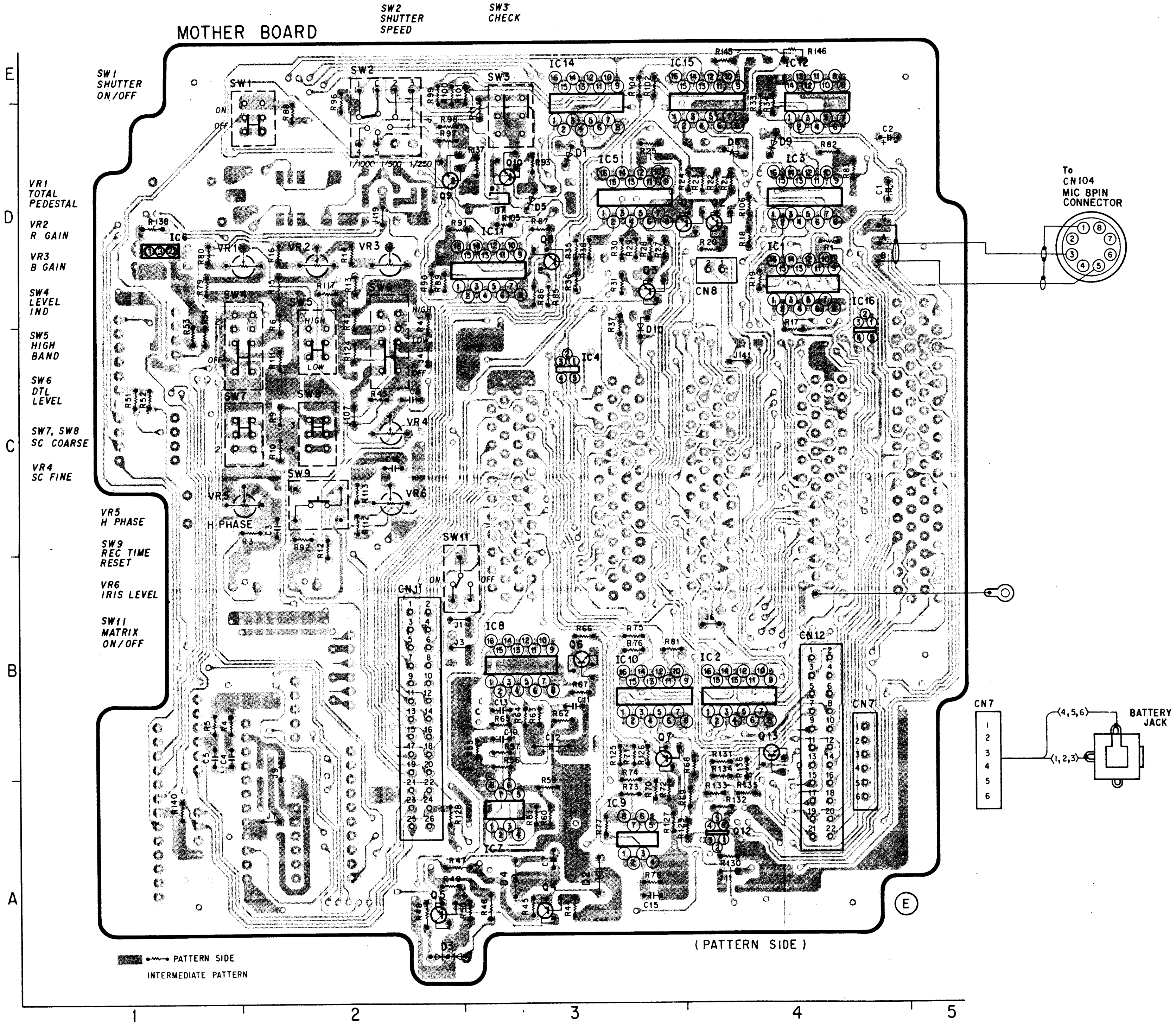
1 2 3 4 5 6 7

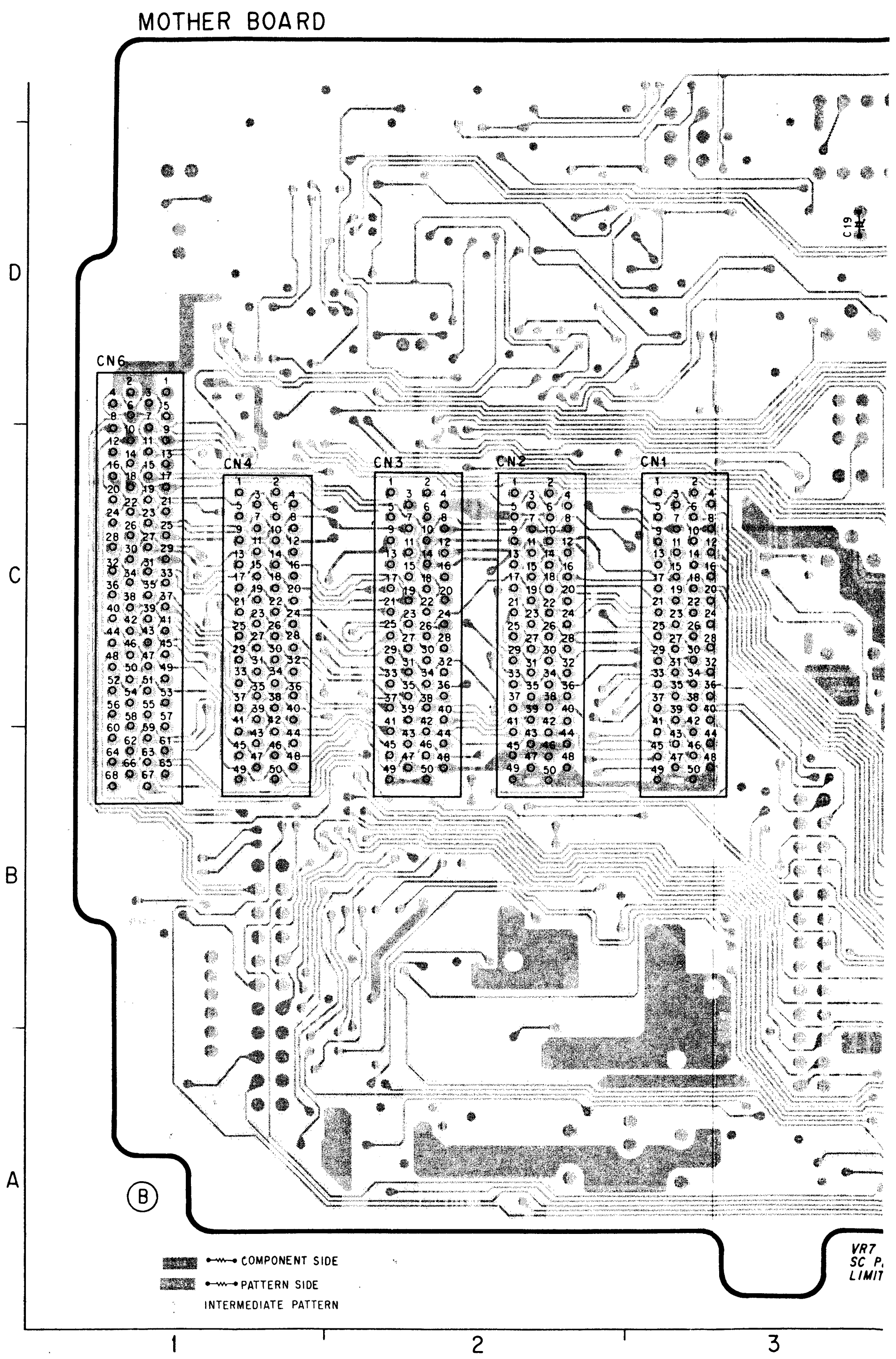
CONDUCTOR VIEW OF MOTHER BOARD

<Index>

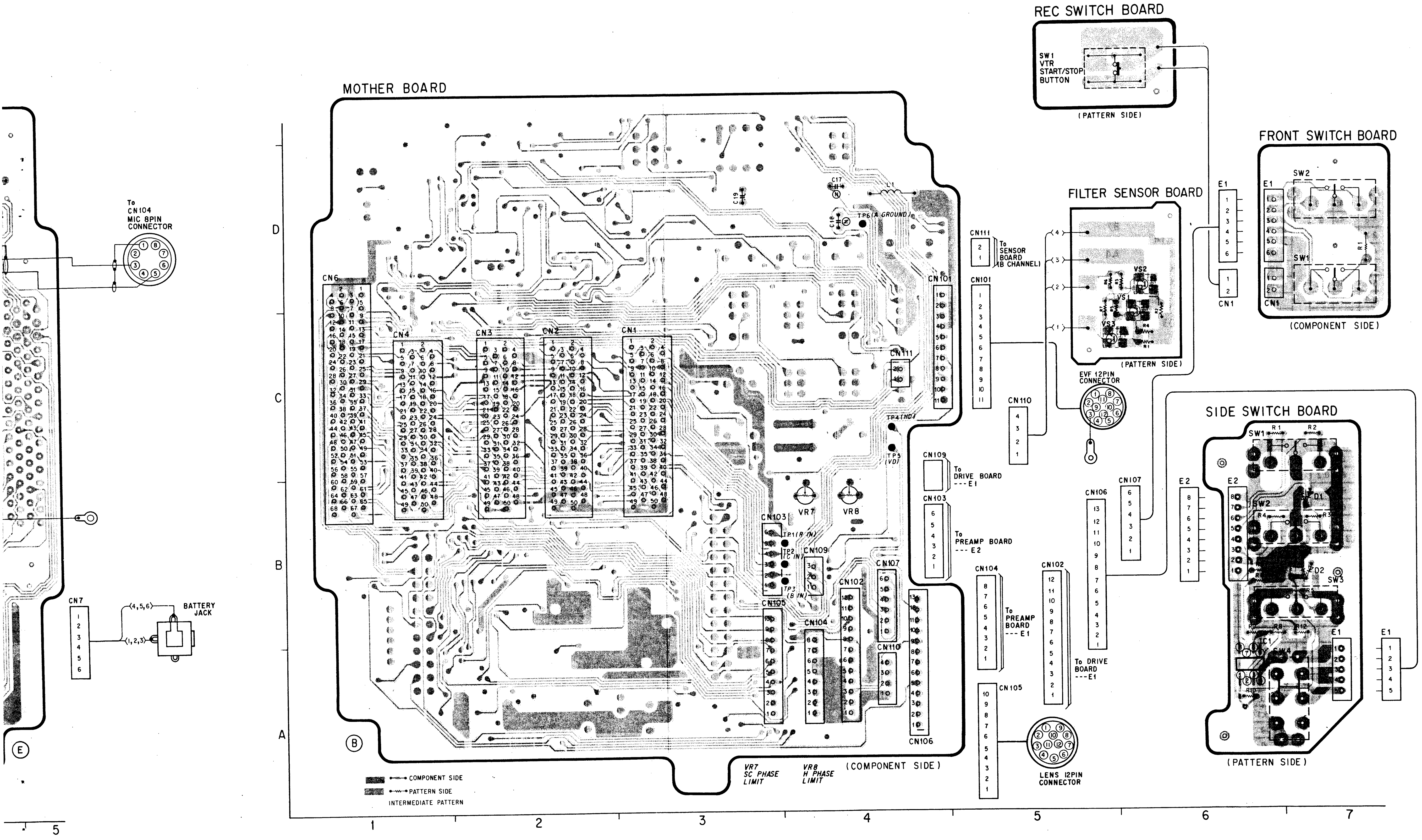
MOTHER BOARD
<PATTERN SIDE>

Ref No.	Address
IC1	D4
IC2	B4
IC3	D4
IC4	C3
IC5	D3
IC6	D1
IC7	A3
IC8	B3
IC9	A3
IC10	B3
IC11	D3
IC12	D4
IC14	D3
IC15	D4
IC16	C4
Q1	D4
Q2	D4
Q3	D3
Q4	A3
Q5	A2
Q6	B3
Q7	B3
Q8	D3
Q9	D3
Q10	D10
Q12	A4
Q13	B4
D1	D3
D2	A3
D3	A2
D4	A3
D5	D3
D7	D3
D8	D4
D9	D4
D10	D3

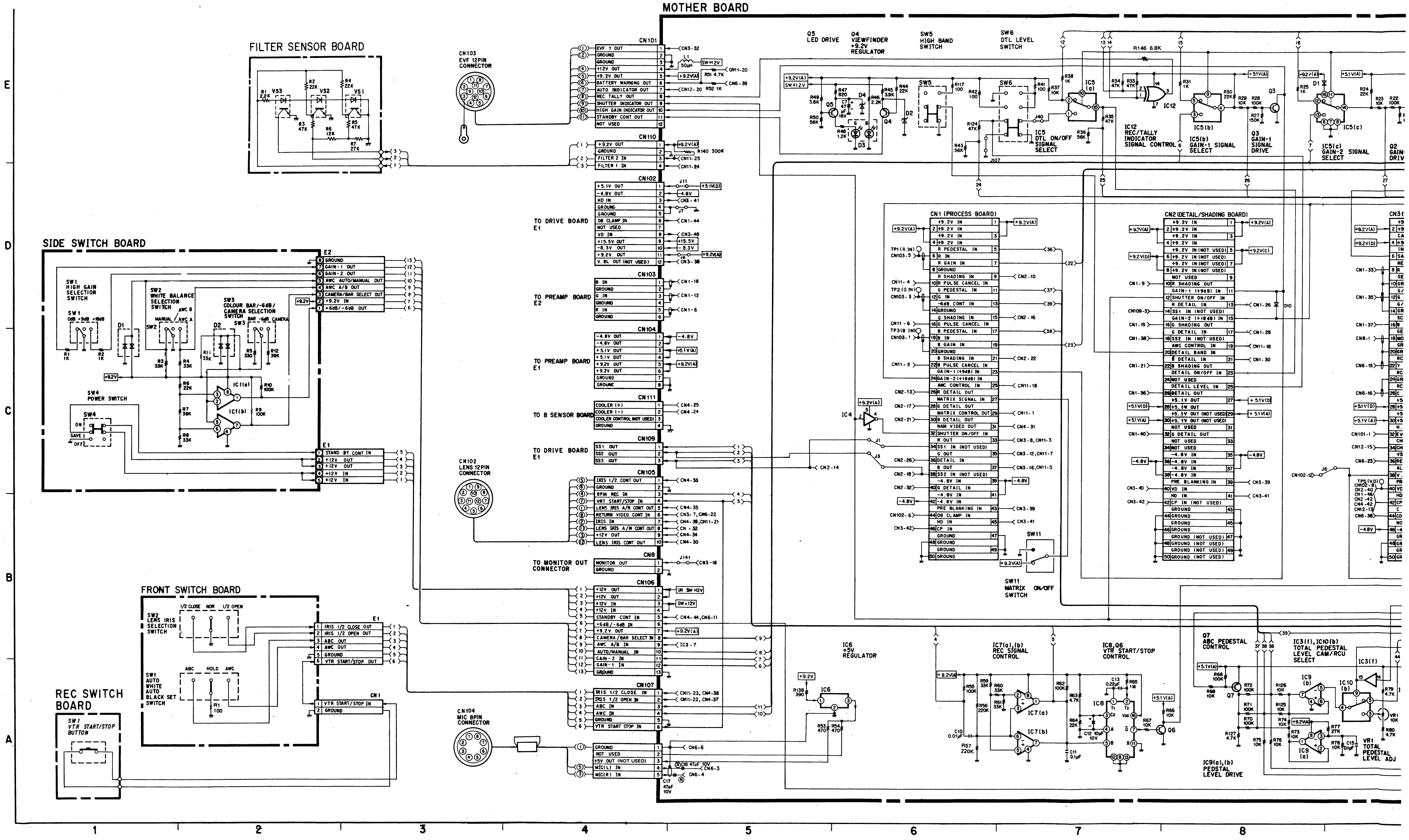

MOTHER BOARD
SW2 SHUTTER SPEED
SW3 CHECK
SW1 SHUTTER ON/OFF
VR1 TOTAL PEDESTAL
VR2 R GAIN
VR3 B GAIN
SW4 LEVEL IND
SW5 HIGH BAND
SW6 DTL LEVEL
SW7, SW8 SC COARSE
VR4 SC FINE
VR5 H PHASE
SW9 REC TIME RESET
VR6 IRIS LEVEL
SW11 MATRIX ON/OFF
To CN104 MIC 8PIN CONNECTOR
CN7
BATTERY JACK
(4,5,6)
(1,2,3)
CN11
CN12
CN8
E
(PATTERN SIDE)
PATTERN SIDE
INTERMEDIATE PATTERN
E
D
C
B
A
1
2
3
4
5


MOTHER BOARD
CN6
CN4
CN3
CN2
CN1
B
COMPONENT SIDE
PATTERN SIDE
INTERMEDIATE PATTERN
VR7
SC P
LIMIT
D
C
B
A
1
2
3

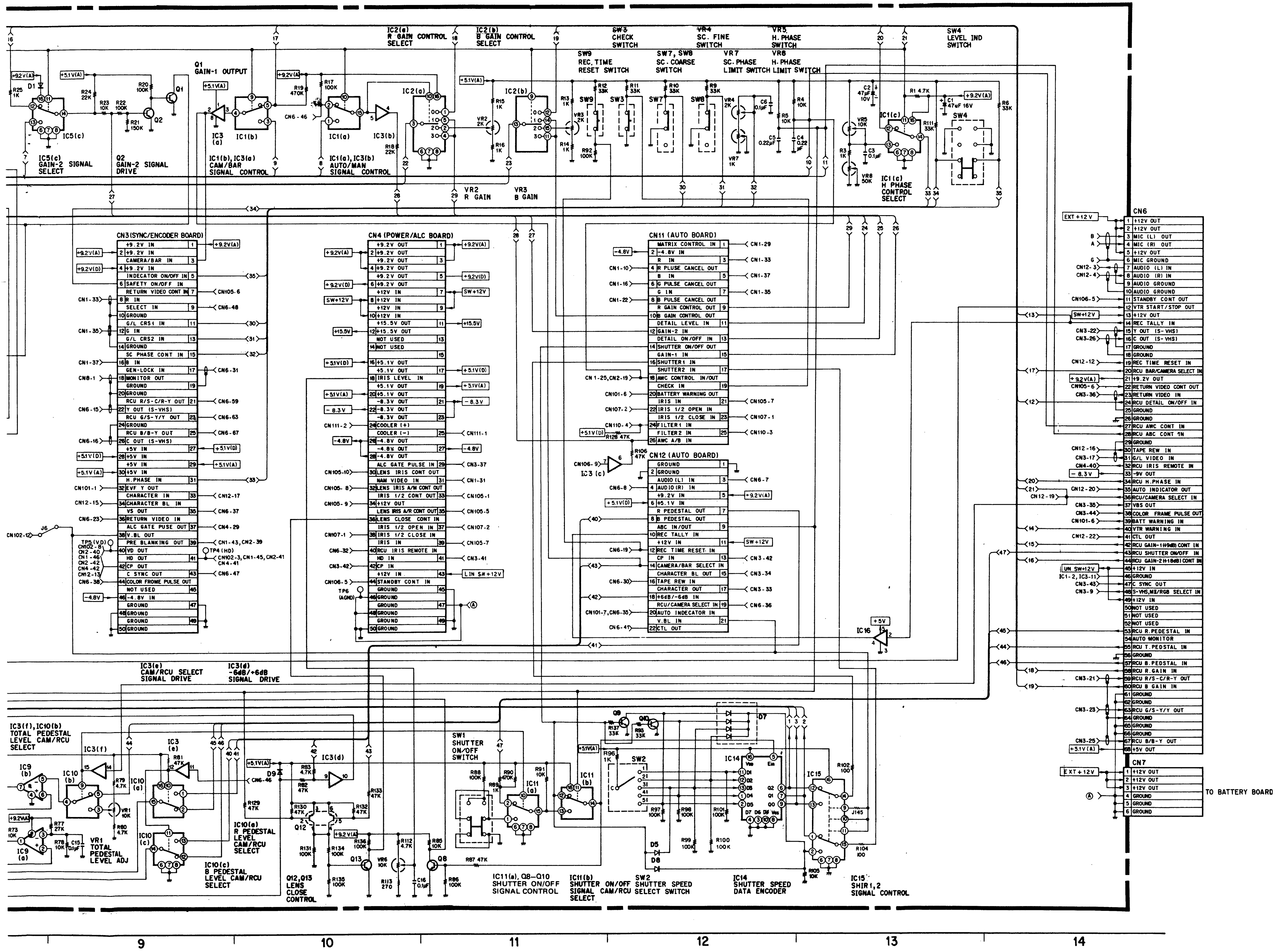
CONDUCTOR VIEW OF MOTHER BOARD


REC SWITCH BOARD
SW1 VTR START/STOP BUTTON
(PATTERN SIDE)
FRONT SWITCH BOARD
SW2
SW1
R1
E1
CN1
(COMPONENT SIDE)
FILTER SENSOR BOARD
VS1
VS2
VS3
R4
R1
(PATTERN SIDE)
EVF 12PIN CONNECTOR
SIDE SWITCH BOARD
SW1
SW2
SW3
SW4
R1
R2
R3
R4
D1
D2
IC1
E1
E2
(PATTERN SIDE)
MOTHER BOARD
CN1
CN2
CN3
CN4
CN6
CN101
CN102
CN103
CN104
CN105
CN106
CN107
CN109
CN110
CN111
C17
C18
C19
L1
TP1 (R IN)
TP2 (C IN)
TP3 (B IN)
TP4 (HD)
TP5 (VD)
TP6 (A GROUND)
VR7
VR8
VR7 SC PHASE LIMIT
VR8 H PHASE LIMIT
(COMPONENT SIDE)
CN111 To SENSOR BOARD (B CHANNEL)
CN109 To DRIVE BOARD ---E1
CN103 To PREAMP BOARD ---E2
CN104 To PREAMP BOARD ---E1
CN102 To DRIVE BOARD ---E1
CN105
LENS 12PIN CONNECTOR
To CN104 MIC 8PIN CONNECTOR
CN7
BATTERY JACK
(4,5,6)
(1,2,3)
E
B
D
C
B
A
1
2
3
4
5
6
7
5
COMPONENT SIDE
PATTERN SIDE
INTERMEDIATE PATTERN

SCHEMATIC DIAGRAM OF MOTHER BOARI


MOTHER BOARD
FILTER SENSOR BOARD
SIDE SWITCH BOARD
FRONT SWITCH BOARD
REC SWITCH BOARD
SW1 VTR START/STOP BUTTON
CN103 EVF 12PIN CONNECTOR
CN102 LENS 12PIN CONNECTOR
CN104 MIC 8PIN CONNECTOR
CN101
CN110
CN102
CN103
CN104
CN111
CN109
CN105
CN8
CN106
CN107
TO DRIVE BOARD E1
TO PREAMP BOARD E2
TO PREAMP BOARD E1
TO B SENSOR BOARD
TO DRIVE BOARD E1
TO MONITOR OUT CONNECTOR
SW1 HIGH GAIN SELECTION SWITCH
SW2 WHITE BALANCE SELECTION SWITCH
SW3 COLOUR BAR/-6dB/CAMERA SELECTION SWITCH
SW4 POWER SWITCH
SW2 LENS IRIS SELECTION SWITCH
SW1 AUTO WHITE AUTO BLACK SET SWITCH
Q5 LED DRIVE
Q4 VIEWFINDER +9.2V REGULATOR
SW5 HIGH BAND SWITCH
SW6 DTL LEVEL SWITCH
IC5 DTL ON/OFF SIGNAL SELECT
IC12 REC/TALLY INDICATOR SIGNAL CONTROL
IC5(b) GAIN-1 SIGNAL SELECT
Q3 GAIN-1 SIGNAL DRIVE
IC5(c) GAIN-2 SIGNAL SELECT
Q2 GAIN DRIV
CN1 (PROCESS BOARD)
CN2 (DETAIL/SHADING BOARD)
CN3
SW11 MATRIX ON/OFF SWITCH
IC6 +5V REGULATOR
IC7(a),(b) REC SIGNAL CONTROL
IC8,Q6 VTR START/STOP CONTROL
Q7 ABC PEDESTAL CONTROL
IC3(f),IC10(b) TOTAL PEDESTAL LEVEL CAM/RCU SELECT
IC9(a),(b) PEDSTAL LEVEL DRIVE
VR1 TOTAL PEDESTAL LEVEL ADJ
E
D
C
B
A
1
2
3
4
5
6
7
8

THER BOARD



IC2(a) R GAIN CONTROL SELECT
IC2(b) B GAIN CONTROL SELECT
SW3 CHECK SWITCH
VR4 SC. FINE SWITCH
VR5 H. PHASE SWITCH
SW4 LEVEL IND SWITCH
SW9 REC. TIME RESET SWITCH
SW7, SW8 SC. COARSE SWITCH
VR7 SC. PHASE LIMIT SWITCH
VR8 H. PHASE LIMIT SWITCH
Q1 GAIN-1 OUTPUT
IC5(c) GAIN-2 SIGNAL SELECT
Q2 GAIN-2 SIGNAL DRIVE
IC1(b), IC3(a) CAM/BAR SIGNAL CONTROL
IC1(a), IC3(b) AUTO/MAN SIGNAL CONTROL
VR2 R GAIN
VR3 B GAIN
IC1(c) H PHASE CONTROL SELECT
CN3 (SYNC/ENCODER BOARD)
CN4 (POWER/ALC BOARD)
CN11 (AUTO BOARD)
CN12 (AUTO BOARD)
CN6
CN7
TO BATTERY BOARD
IC3(e) CAM/RCU SELECT SIGNAL DRIVE
IC3(d) -6dB/+6dB SIGNAL DRIVE
IC3(f), IC10(b) TOTAL PEDESTAL LEVEL CAM/RCU SELECT
VR1 TOTAL PEDESTAL LEVEL ADJ
IC10(a) R PEDESTAL LEVEL CAM/RCU SELECT
IC10(c) B PEDESTAL LEVEL CAM/RCU SELECT
Q12, Q13 LENS CLOSE CONTROL
SW1 SHUTTER ON/OFF SWITCH
IC11(a), Q8–Q10 SHUTTER ON/OFF SIGNAL CONTROL
IC11(b) SHUTTER ON/OFF SIGNAL CAM/RCU SELECT
SW2 SHUTTER SPEED SELECT SWITCH
IC14 SHUTTER SPEED DATA ENCODER
IC15 SHIR 1, 2 SIGNAL CONTROL
IC16
9
10
11
12
13
14

< Voltages > MOTHER BOARD

	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC12	IC14	IC15	IC16
Pin 1	0	-0.4	5.1	-	0	0.3	0	0	2.5	2.6	0	5.1	0	0	-
2	9.1	2.6	5.0	8.7	0.1	0.1	3.1	4.4	2.5	0.3	4.9	5.1	0	4.9	5.1
3	9.1	2.6	9.1	0	0.2	0.1	4.7	7.6	2.5	2.5	0.1	0	0	0.1	0
4	9.1	2.5	0	0	0.2		0	0	0	2.5	0.1	0	0	0	0
5	8.7	2.5	0	9.2	0.1		6.1	9.1	2.5	-0.4	0.1	0	0	0	5.1
6	0	0	5.1		0		4.7	0	2.5	0	0	0	0	0	
7	0	0	9.1		0		9.1	9.0	2.5	0	0	0	0	0	
8	0	0	0		0		9.2	0	9.1	0	0	0	0	0	
9	7.9	7.9	4.8		7.9			9.2		5.1	0.1	0	0	0.1	
10	7.9	0	5.1		7.9			0		5.1	5.1	0	0	0.4	
11	7.9	2.5	9.1		7.9			0		5.1	5.1	0	0	0.4	
12	-0.4	-0.4	5.1		0.1			0		-0.4	0	0	4.6	0	
13	3.3	2.5	-		4.2			0		2.5	0.1	0	0	0	
14	3.3	2.5	7.9		4.2			9.2		2.5	0.1	5.1	0	0	
15	0	0	5.1		0.1			0		2.5	0.1		0	4.5	
16	9.2	9.2	-		8.9			9.2		5.1	5.1		5.1	5.1	

	B	C	E
Q 1	0	8.7	0
2	0.6	0	0
3	0.1	9.1	0
4	9.1	0	8.4
5	8.3	0	8.4
6	0.7	0	0
7	5.1	0.2	5.1
8	0	8.7	0
9	0	0	0
10	0	0	0
11	0	0	0
13	0	10.3	0

	Q12
Pin 1	5.1
2	5.0
3	0
4	5.1
5	5.1
6	0

SIDE SWITCH

	IC1
Pin 1	5.5
2	0
3	7.0
4	0
5	0
6	3.2
7	9.1
8	9.2

<Index>

MOTHER BOARD

Ref No.	Address
IC1	E10, E13
IC2	E11
IC3	A9, A10, C12, E9, E10
IC4	C6
IC5	E7, E8, E9
IC6	A6
IC7	A7
IC8	A7
IC9	A8
IC10	A9
IC11	A11
IC12	E7
IC14	A12
IC15	A13
IC16	B13
Q1	E9
Q2	E9
Q3	E8
Q4	E6
Q5	E6
Q6	A7
Q7	A8
Q8	A11
Q9	B12
Q10	B12
Q12	A10
Q13	A10
D1	E8
D2	E6
D3	E6
D4	E6
D9	A10

FILTER SENSOR BOARD

VS1	E3
VS2	E2
VS3	E2

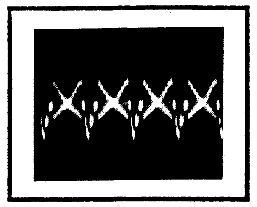
SIDE SWITCH

IC1	C2
D1	C1
D2	C2

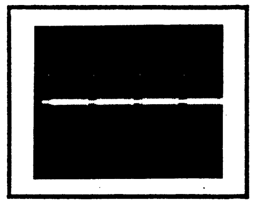
SCHEMATIC DIAGRAM OF MAIN

<Waveforms>

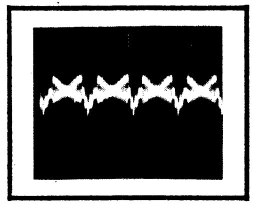
1. 20mV/DIV, 20µsec/DIV



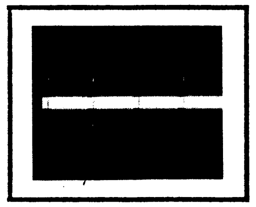
7. 0.2V/DIV, 20µsec/DIV



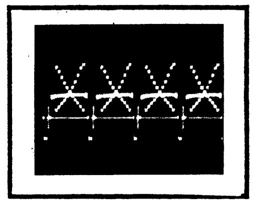
2. 20mV/DIV, 20µsec/DIV



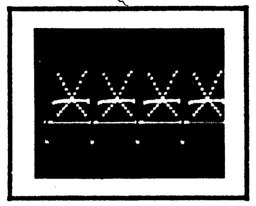
8. 0.2V/DIV, 20µsec/DIV



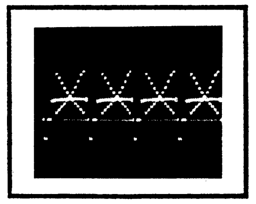
3. 0.5V/DIV, 20µsec/DIV



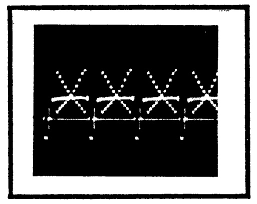
9. 0.5V/DIV, 20µsec/DIV



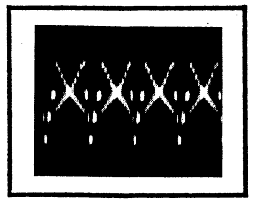
4. 0.5V/DIV, 20µsec/DIV



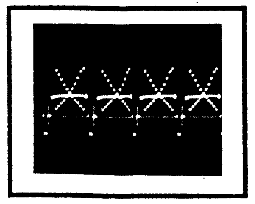
10. 0.5V/DIV, 20µsec/DIV



5. 20V/DIV, 20µsec/DIV

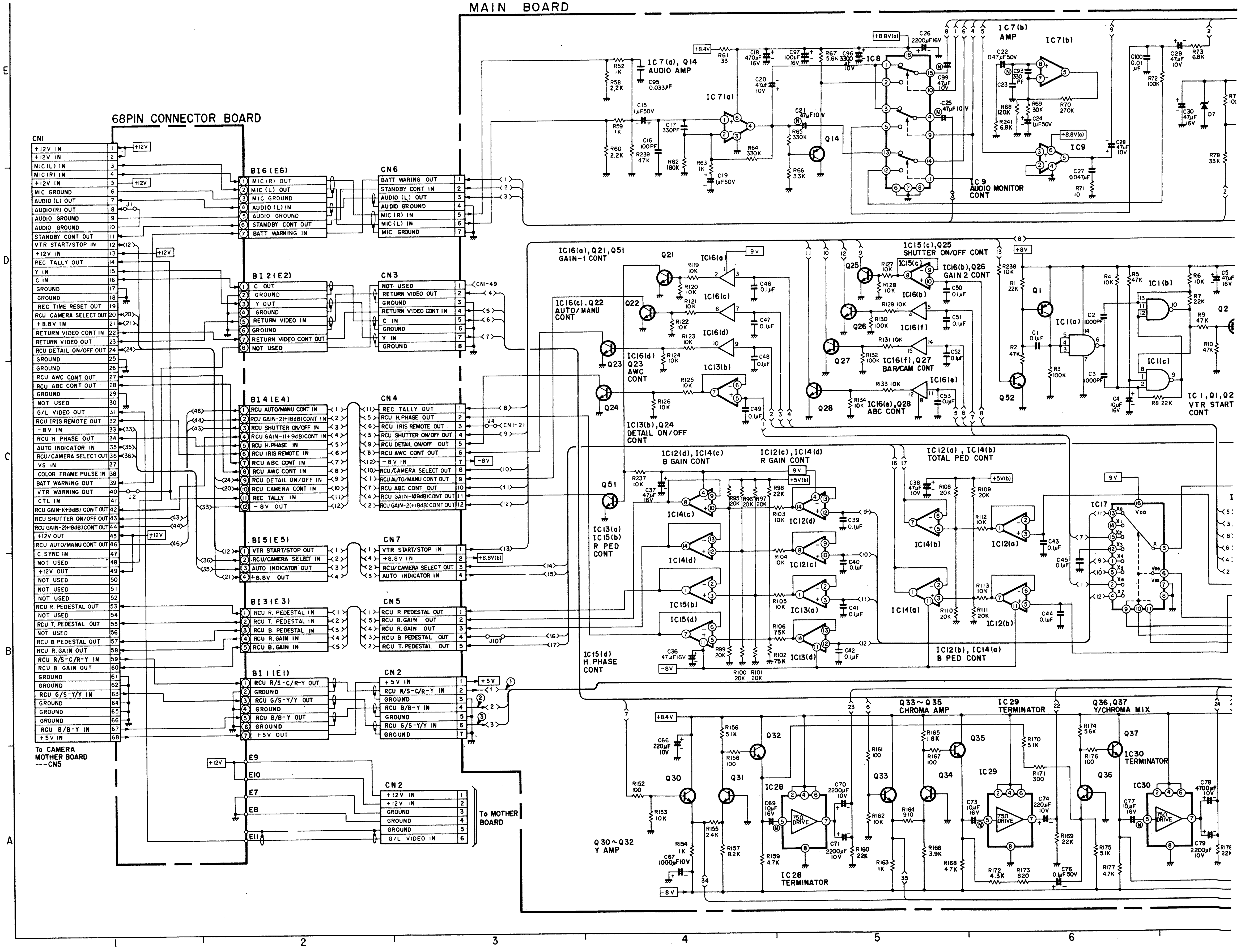


6. 0.5V/DIV, 20µsec/DIV

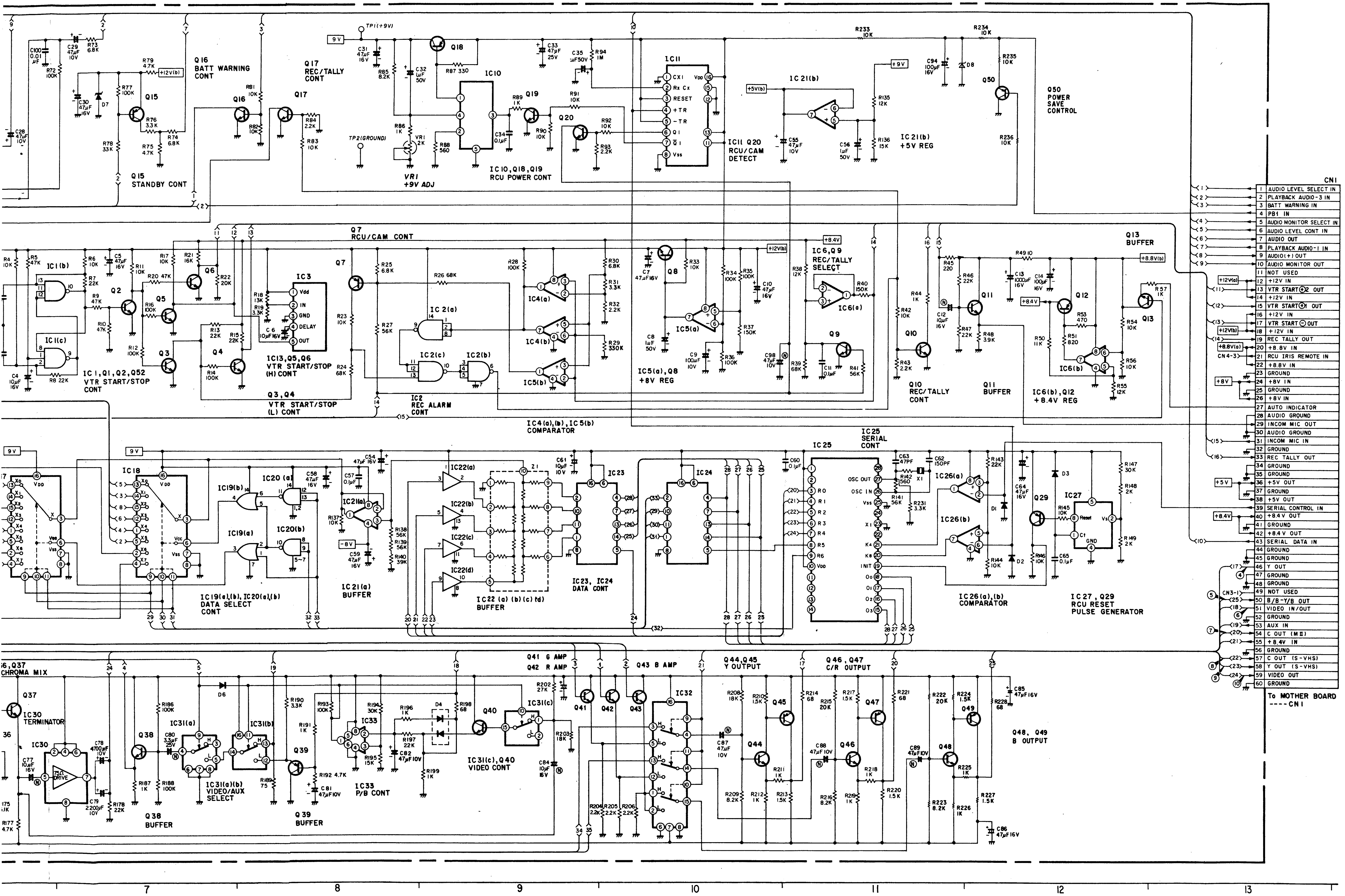


	B	C	E
Q5	0.5	0.1	0
15	6.7	0.1	1.4
44	-3.0	8.2	-3.6
45	8.2	0.6	8.8
46	-3.4	8.2	-4.0
47	8.2	-0.2	8.8
48	-3.5	8.2	-4.0
49	8.2	-0.3	8.8
50	9.4	0.1	1.1

	IC3
Pin 1	0.7
2	0.1
3	0
4	0
5	0.1


MAIN BOARD
68PIN CONNECTOR BOARD
CN1
+12V IN 1
+12V IN 2
MIC (L) IN 3
MIC (R) IN 4
+12V IN 5
MIC GROUND 6
AUDIO (L) OUT 7
AUDIO (R) OUT 8
AUDIO GROUND 9
AUDIO GROUND 10
STANDBY CONT OUT 11
VTR START/STOP IN 12
+12V IN 13
REC TALLY OUT 14
Y IN 15
C IN 16
GROUND 17
GROUND 18
REC TIME RESET OUT 19
RCU CAMERA SELECT OUT 20
+8.8V IN 21
RETURN VIDEO CONT IN 22
RETURN VIDEO OUT 23
RCU DETAIL ON/OFF OUT 24
GROUND 25
GROUND 26
RCU AWC CONT OUT 27
RCU ABC CONT OUT 28
GROUND 29
NOT USED 30
G/L VIDEO OUT 31
RCU IRIS REMOTE OUT 32
-8V IN 33
RCU H. PHASE OUT 34
AUTO INDICATOR IN 35
RCU/CAMERA SELECT OUT 36
VS IN 37
COLOR FRAME PULSE IN 38
BATT WARNING OUT 39
VTR WARNING OUT 40
CTL IN 41
RCU GAIN-1(+9dB) CONT OUT 42
RCU SHUTTER ON/OFF OUT 43
RCU GAIN-2(+18dB) CONT OUT 44
+12V OUT 45
RCU AUTO/MANU CONT OUT 46
C. SYNC IN 47
NOT USED 48
+12V OUT 49
NOT USED 50
NOT USED 51
NOT USED 52
RCU R. PEDESTAL OUT 53
NOT USED 54
RCU T. PEDESTAL OUT 55
NOT USED 56
RCU B. PEDESTAL OUT 57
RCU R. GAIN OUT 58
RCU R/S-C/R-Y IN 59
RCU B GAIN OUT 60
GROUND 61
GROUND 62
RCU G/S-Y/Y IN 63
GROUND 64
GROUND 65
GROUND 66
RCU B/B-Y IN 67
+5V IN 68
To CAMERA MOTHER BOARD ---CN5
J1
J2
+12V
B16 (E6)
B12 (E2)
B14 (E4)
B15 (E5)
B13 (E3)
B11 (E1)
E9
E10
E7
E8
E11
CN6
CN3
CN4
CN7
CN5
CN2
CN2
To MOTHER BOARD
IC7(a), Q14 AUDIO AMP
IC7(a)
Q14
IC8
IC7(b) AMP
IC7(b)
IC9
IC9 AUDIO MONITOR CONT
IC16(a), Q21, Q51 GAIN-1 CONT
IC16(c), Q22 AUTO/MANU CONT
IC16(d) Q23 AWC CONT
IC13(b), Q24 DETAIL ON/OFF CONT
IC15(c), Q25 SHUTTER ON/OFF CONT
IC16(b), Q26 GAIN 2 CONT
IC16(f), Q27 BAR/CAM CONT
IC16(e), Q28 ABC CONT
IC1, Q1, Q2 VTR START CONT
IC12(d), IC14(c) B GAIN CONT
IC12(c), IC14(d) R GAIN CONT
IC12(a), IC14(b) TOTAL PED CONT
IC12(b), IC14(a) B PED CONT
IC13(a) IC15(b) R PED CONT
IC15(d) H. PHASE CONT
IC17
Q30~Q32 Y AMP
Q33~Q35 CHROMA AMP
IC29 TERMINATOR
Q36, Q37 Y/CHROMA MIX
IC28 TERMINATOR
IC30 TERMINATOR
+8.4V
+8.8V(a)
+8.8V(b)
9V
+5V(b)
-8V
+5V
A
B
C
D
E
1
2
3
4
5
6

AM OF MAIN BOARD FOR CAMERA ADAPTOR


Q15 STANDBY CONT
Q16 BATT WARNING CONT
Q17 REC/TALLY CONT
IC10, Q18, Q19 RCU POWER CONT
VR1 +9V ADJ
TP1(+9V)
TP2(GROUND)
IC11 Q20 RCU/CAM DETECT
IC21(b) +5V REG
Q50 POWER SAVE CONTROL
Q7 RCU/CAM CONT
IC1, Q1, Q2, Q52 VTR START/STOP CONT
IC13, Q5, Q6 VTR START/STOP (H) CONT
Q3, Q4 VTR START/STOP (L) CONT
IC2 REC ALARM CONT
IC4(a),(b), IC5(b) COMPARATOR
IC5(a), Q8 +8V REG
IC6, Q9 REC/TALLY SELECT
Q10 REC/TALLY CONT
Q11 BUFFER
IC6(b), Q12 +8.4V REG
Q13 BUFFER
IC19(a),(b), IC20(a),(b) DATA SELECT CONT
IC21(a) BUFFER
IC22 (a) (b) (c) (d) BUFFER
IC23, IC24 DATA CONT
IC25 SERIAL CONT
IC26(a),(b) COMPARATOR
IC27, Q29 RCU RESET PULSE GENERATOR
Q36, Q37 CHROMA MIX
IC30 TERMINATOR
75Ω DRIVE
Q38 BUFFER
IC31(a)(b) VIDEO/AUX SELECT
Q39 BUFFER
IC33 P/B CONT
IC31(c), Q40 VIDEO CONT
Q41 G AMP
Q42 R AMP
Q43 B AMP
Q44, Q45 Y OUTPUT
Q46, Q47 C/R OUTPUT
Q48, Q49 B OUTPUT
CN1
1 AUDIO LEVEL SELECT IN
2 PLAYBACK AUDIO-3 IN
3 BATT WARNING IN
4 PB1 IN
5 AUDIO MONITOR SELECT IN
6 AUDIO LEVEL CONT IN
7 AUDIO OUT
8 PLAYBACK AUDIO-1 IN
9 AUDIO(+) OUT
10 AUDIO MONITOR OUT
11 NOT USED
12 +12V IN
13 VTR START⊕2 OUT
14 +12V IN
15 VTR START⊕1 OUT
16 +12V IN
17 VTR START ⊖ OUT
18 +12V IN
19 REC TALLY OUT
20 +8.8V IN
21 RCU IRIS REMOTE IN
22 +8.8V IN
23 GROUND
24 +8V IN
25 GROUND
26 +8V IN
27 AUTO INDICATOR
28 AUDIO GROUND
29 INCOM MIC OUT
30 AUDIO GROUND
31 INCOM MIC IN
32 GROUND
33 REC TALLY OUT
34 GROUND
35 GROUND
36 +5V OUT
37 GROUND
38 +5V OUT
39 SERIAL CONTROL IN
40 +8.4V OUT
41 GROUND
42 +8.4V OUT
43 SERIAL DATA IN
44 GROUND
45 GROUND
46 Y OUT
47 GROUND
48 GROUND
49 NOT USED
50 B/B-Y/B OUT
51 VIDEO IN/OUT
52 GROUND
53 AUX IN
54 C OUT (MII)
55 +8.4V IN
56 GROUND
57 C OUT (S-VHS)
58 Y OUT (S-VHS)
59 VIDEO OUT
60 GROUND
To MOTHER BOARD ----CN1
7
8
9
10
11
12
13

< Index >

AD MAIN BOARD

Ref No.	Address
IC1	C7, D6, D7
IC2	C9, D9
IC3	D8
IC4	D9
IC5	C9, D10
IC6	C12, D11
IC7	E4, E6
IC8	E5
IC9	E6
IC10	E9
IC11	E10
IC12	B5, B6, C5, C6
IC13	B5, C4
IC14	B5, C4, C5
IC15	B4, D5
IC16	C5, D4, D5
IC17	B6
IC18	B7
IC19	B8, C8
IC20	B8, C8
IC21	C8, E11
IC22	B9, C9
IC23	B10
IC24	B10
IC25	B11
IC26	B12, C12
IC27	B2
IC28	A5
IC29	A6
IC30	A7
IC31	A7, A8, A9
IC32	A10
IC33	A8
Q1	D6
Q2	D7
Q3	C7
Q4	C8
Q5	D7
Q6	D7
Q7	D8
Q8	D10
Q9	C11
Q10	C11
Q11	D12
Q12	D12
Q13	D12
Q14	E5
Q15	E7
Q16	E8
Q17	E8
Q18	E9
Q19	E9
Q20	E9
Q21	D4
Q22	D4
Q23	D4
Q24	C4
Q25	D5
Q26	D5
Q27	D5
Q28	C5
Q29	B12
Q30	A4
Q31	A4
Q32	A4
Q33	A5
Q34	A5
Q35	A5
Q36	A6
Q37	A6
Q38	A7
Q39	A8
Q40	A9
Q44	A10
Q45	A11
Q46	A11
Q47	A11
Q48	A11
Q49	A11
Q50	E12
Q51	C4
Q52	C6
D1	C12
D2	B12
D3	C12
D4	A9
D6	B7
D7	E7
D8	E12

CONDUCTOR VIEW OF MAIN BOARD FOR CAMERA ADAPTOR

<Voltages>

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1	0.7	0.7	0	0	0	0	0	0.5	0.7	0.5	0.7	0.7	0	0.7		
IC2	0.5	0.5	0	0	0	0	0	0.5	0	0	0	0	0	0.7		
IC3	0.7	0.1	0	0	0.1											
IC4	0.5	1.5	0	0	3.7	0	0.5	0.7								
IC5	1.4	0	3.7	0	0.7	0.5	0.1	1.1								
IC7	1.4	1.5	0.2	5.4	4.5	8.0	1.5	1.4								
IC8	5.1	0.9	5.1	0.2	0	0.2	0.2	0.2	8.0	8.0	8.0	0	0.2	0.2	5.1	8.0
IC9	1.4	0.2	0.2	0.2	4.2	8.0	4.2	1.4								
IC10	0	-0.1	0	0	1.1											
IC11	0	1.1	1.1	0	1.1	0	0.6	0	1.1	0.2	1.1	0	1.1	0.2	0	1.1
IC12	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.5	-8.3	-0.5	-0.6	-0.6		
IC13	-0.6	-0.6	-0.6	-0.5	-0.5	-0.6	-0.6	-0.3	0	-0.5	-8.3	-0.1	-0.3	-0.3		
IC14	-0.4	-0.4	-0.4	-0.5	-0.4	-0.6	-0.6	-0.4	-0.4	-0.4	-8.3	-0.4	-0.4	-0.4		
IC15	-0.4	-0.4	-0.4	-0.5	-0.4	-0.4	-0.4	-0.6	0	-0.5	-8.3	0	-0.8			
IC16	-0.5	-0.1	-0.5	-0.4	-0.5	-0.1	-0.5	0	-0.5	-0.1	-0.5	-0.1	0	-0.5	-0.4	0
IC17	-0.5	0	-0.4	-0.2	-0.5	-0.5	0	0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
IC18	-0.5	0	-0.5	0	0	-0.5	0	0	-0.5	0	-0.5	-0.5	0	-0.5	-0.5	-0.5
IC19	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	0	0	0	-0.5	-0.5	0	0	-0.5		
IC20	0	0	-0.5	-0.5	0	0	0	-0.1	-0.1	-0.5	-0.5	-0.5	-0.5	-0.5		
IC21	-0.4	-0.4	-0.3	-8.3	0	-0.4	0	-0.5								
IC22	-0.5	-0.5	-0.1	-0.5	-0.1	-0.5	-0.1	0	-0.1	0	0	-0.5	0	0	-0.5	0
IC26	0	0	-0.1	0	-0.1	0	0	-0.5								
IC27	-0.3	-0.0	0	0	-0.5	0	0	-0.4								
IC28	3.5	8.4	5.0	8.4	5.0	8.4	3.4	0								
IC29	5.1	8.4	8.0	8.4	5.0	8.4	4.2	0								
IC30	3.5	8.4	0	8.4	4.2	8.4	3.4	0								
IC31	3.3	0	3.2	0	0	0	0	0	8.7	0	0	0	0	0	3.3	8.4
IC32	0	0	-0.8	-0.9	0	0	-8.3	0	8.4	8.4	8.4	0	-0.8	-0.8	0	8.4
IC33	8.5	1.8	2.8	0	8.4	0	0	8.4								

	Pin1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC24	0	-0.1	0	-0.1	-0.5	-0.3	-0.5	-0.2	-0.5	-0.1	-0.5	0	0	-0.1	0	-0.1
IC25	-0.5	-0.5	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.5	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
	Pin17	18	19	20	21	22	23	24	25	26	27	28				
IC24	-0.5	-0.3	-0.5	-0.2	-0.5	-0.1	-0.5	-0.5								
IC25	-0.3	-0.1	-0	-0.1	-0.1	0	0	0	0	0	0	0				

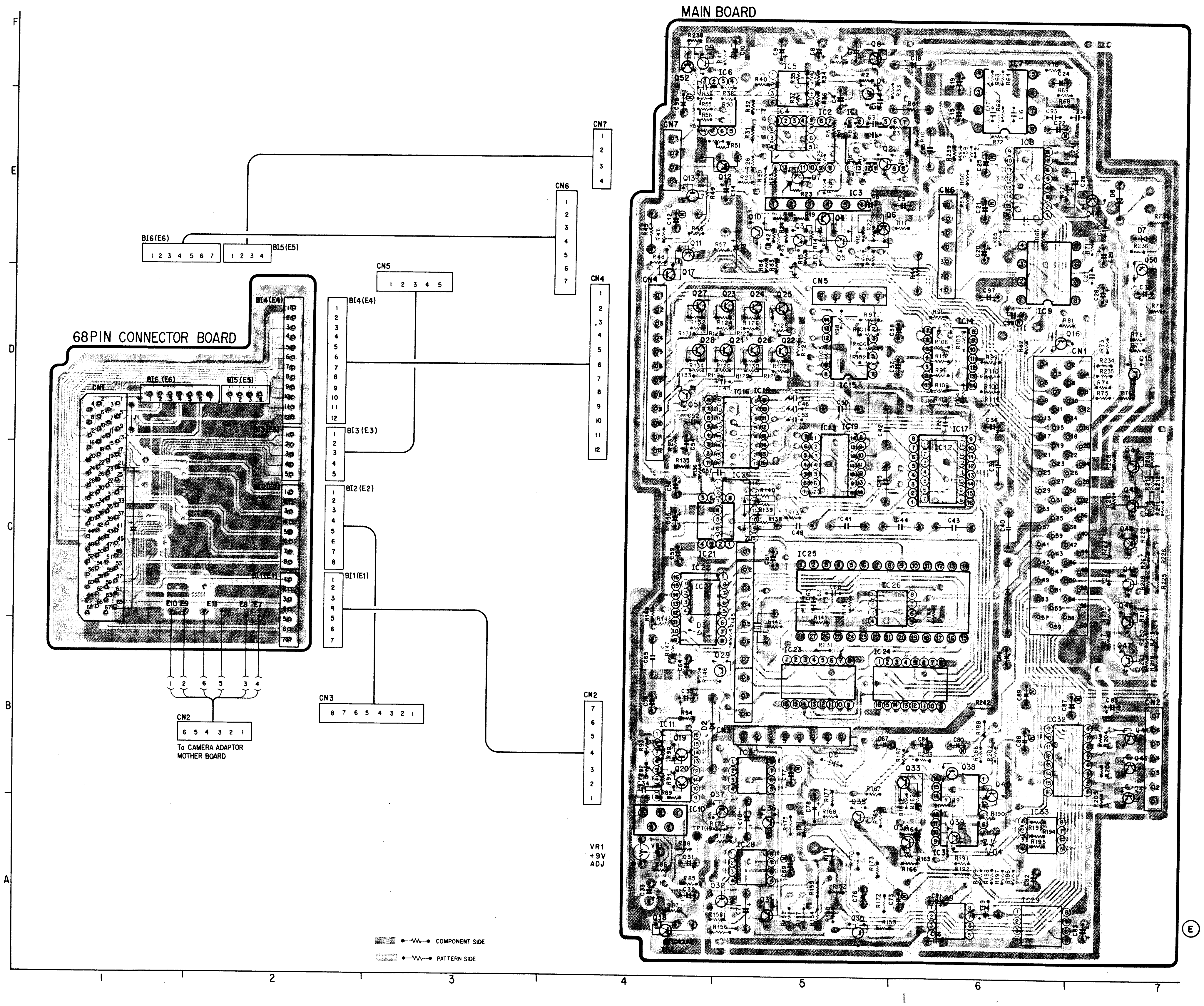
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
B	0.7	0.3	0.6	-	0.5	-	1.4	0.1	0.6	0	4.3	8.1	0	0.2	6.7	0	0
C	0	0.7	2.6	-	0.1	-	1.4	1.1	0	0	8.8	8.4	8.8	0.2	0.1	9.2	0.7
E	0.7	0	0	-	0	-	0.7	0.7	0	0	3.7	8.8	0	0.9	1.4	0	0

	Q18	Q19	Q20	Q21	Q522	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34
B	1.1	0.3	0	0	0	0	-0.3	-0.3	-0.3	-0.3	0	-0.4	-0.2	0	3.0	-0.2	0
C	-0.5	0	6.8	-0.5	8.8	5.0	8.7	4.8	0	8.8	4.6	0	8.4	3.0	8.4	8.4	3.9
E	1.1	0	0	0	0	0	0	0	0	0	0	-0.6	-0.9	-0.6	2.4	-0.9	-0.6

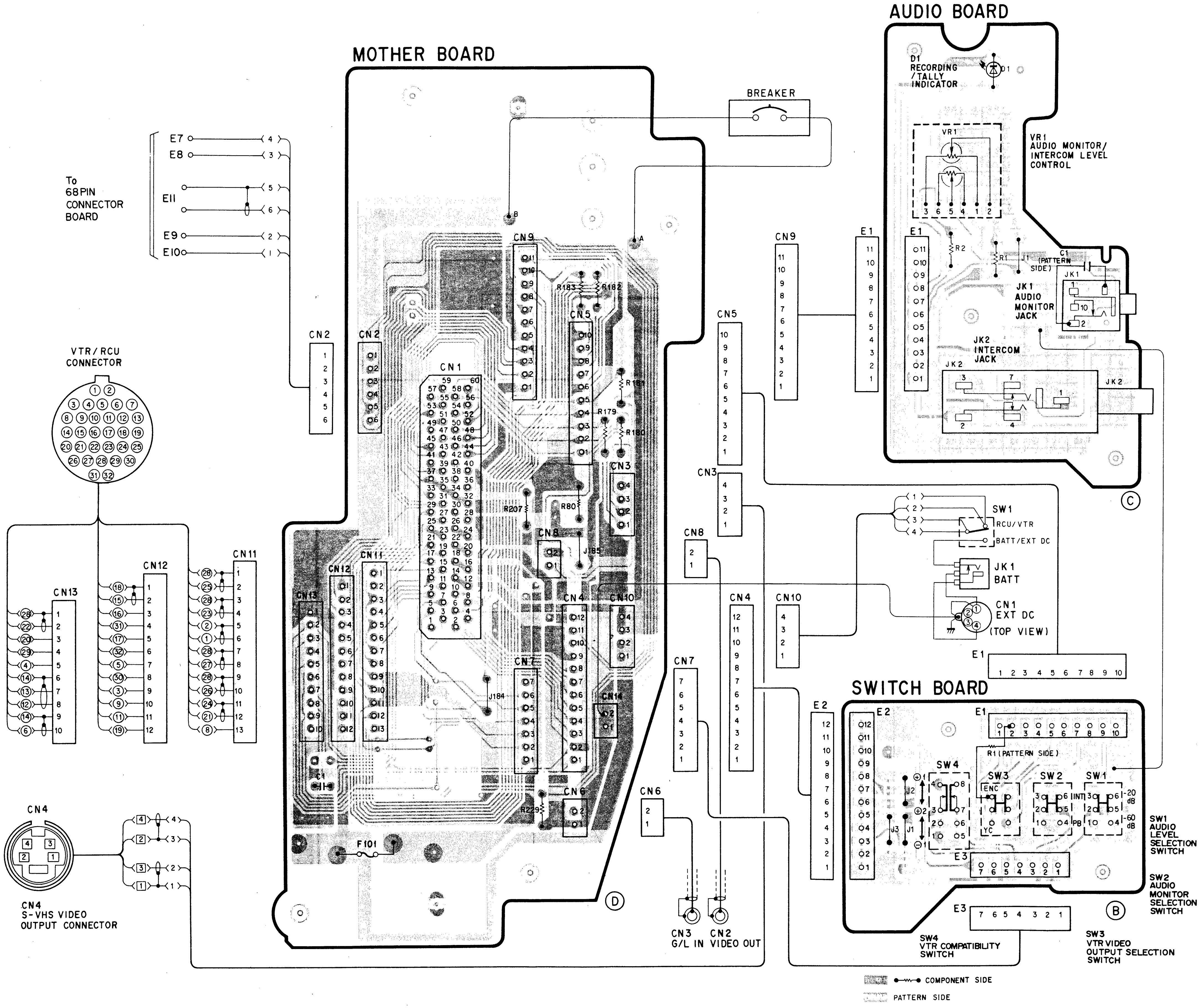
	Q35	Q36	Q37	Q38	Q39	Q40	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52
B	3.9	0	3.0	3.6	2.1	3.3	– 3.0	8.2	– 3.4	8.2	– 3.5	8.2	9.4	-0.5	0
C	8.4	3.0	8.4	8.4	0	0	8.2	0.6	8.2	– 0.2	8.2	– 0.3	0.1	0	0.7
E	3.3	-0.6	2.4	3.0	2.7	2.7	– 3.6	8.8	– 4.0	8.8	– 4.0	8.8	1.1	0	0

<Index>

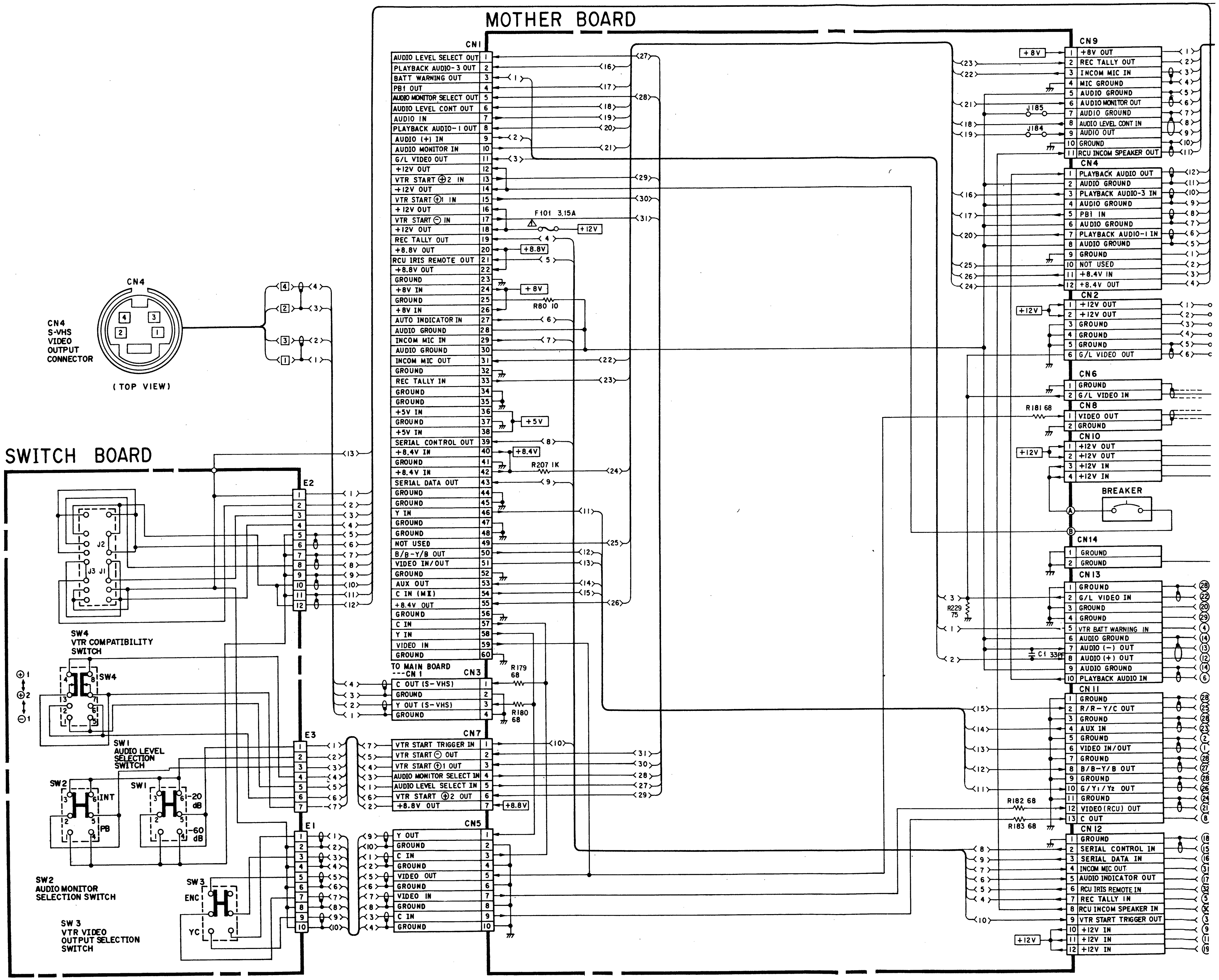
Ref No.	Address								
IC1	E5	IC21	C4	Q8	F5	Q28	D4	Q51	D4
IC2	E5	IC22	C4	Q9	F4	Q29	B5	Q52	F4
IC3	E5	IC23	B5	Q10	E5	Q30	A5	D1	C6
IC4	E5	IC24	B6	Q11	E4	Q31	A5	D2	B4
IC5	F5	IC25	C5	Q12	E5	Q32	A5	D3	B4
IC6	F5	IC26	C5	Q13	E4	Q33	B6	D4	A6
IC7	F6	IC27	C4	Q14	E7	Q34	A6	D6	B5
IC8	E6	IC28	A5	Q15	D7	Q35	A5	D7	E7
IC9	D6	IC29	A6	Q16	D6	Q36	A5	D8	E7
IC10	A4	IC30	B5	Q17	D4	Q37	A5		
IC11	B4	IC31	A6	Q18	A4	Q38	B6		
IC12	C6	IC32	B6	Q19	B4	Q39	A6		
IC13	D5	IC33	A6	Q20	B4	Q40	B6		
IC14	D6	Q1	F5	Q21	D5	Q44	C7		
IC15	D5	Q2	E5	Q22	D5	Q45	C7		
IC16	D5	Q3	E5	Q23	D5	Q46	C7		
IC17	D6	Q4	E5	Q24	D5	Q47	B7		
IC18	D5	Q5	E5	Q25	D5	Q48	C7		
IC19	D5	Q6	E5	Q26	D5	Q49	C7		
IC20	C5	Q7	E5	Q27	D4	Q50	E7		



CONDUCTOR VIEW OF MOTHER BOARD FOR CAMERA ADAPTOR

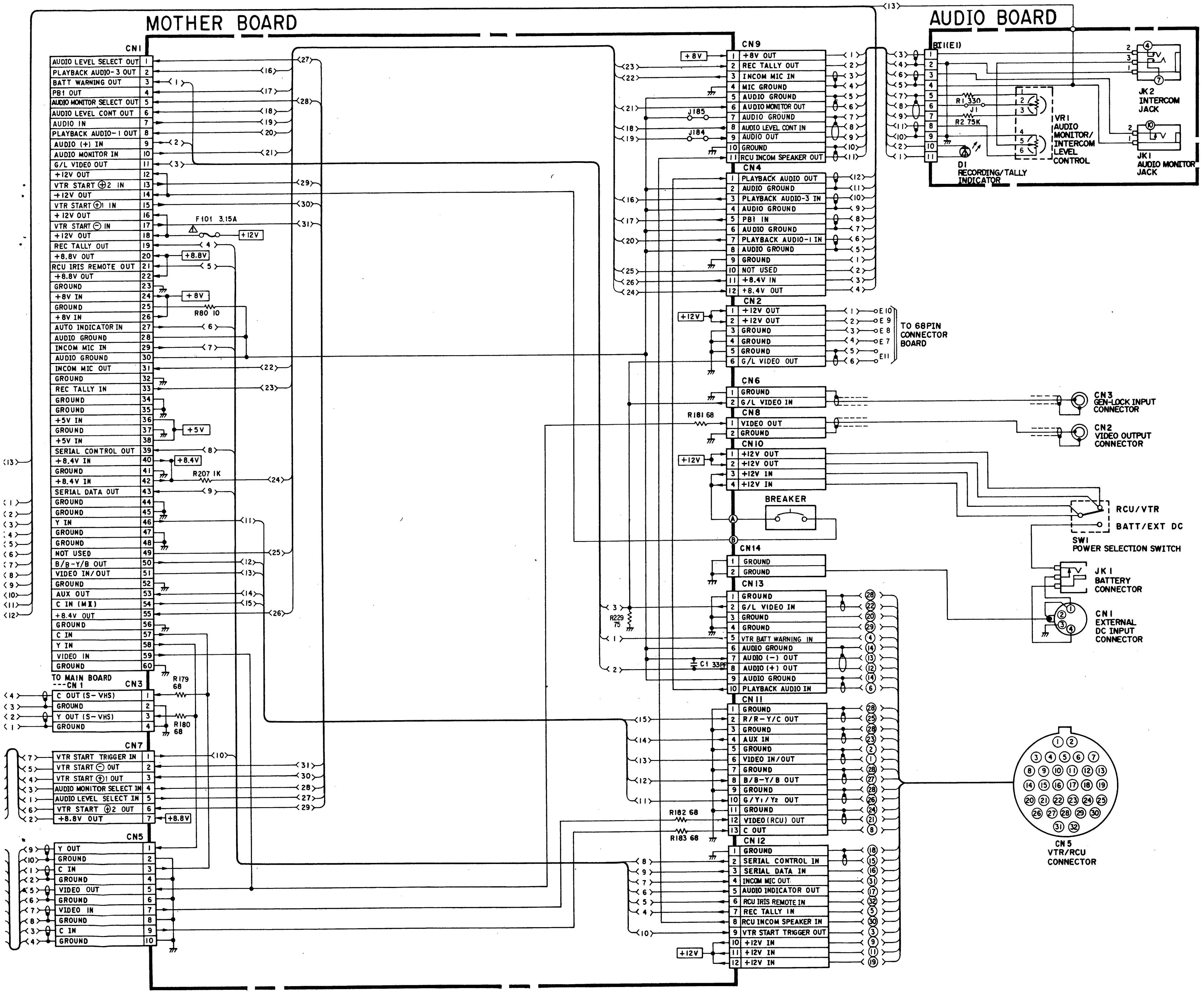

MOTHER BOARD
AUDIO BOARD
SWITCH BOARD
BREAKER
To 68PIN CONNECTOR BOARD
E7
E8
E11
E9
E10
VTR/RCU CONNECTOR
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN13
CN14
R183
R182
R181
R179
R180
R207
R80
J185
J184
R229
F101
D1 RECORDING/TALLY INDICATOR
VR1 AUDIO MONITOR/ INTERCOM LEVEL CONTROL
R2
R1
J1 (PATTERN SIDE)
C1
JK1 AUDIO MONITOR JACK
JK2 INTERCOM JACK
SW1 RCU/VTR
BATT/EXT DC
JK1 BATT
CN1 EXT DC (TOP VIEW)
E1
E2
E3
SW4
SW3
SW2
SW1
ENC
YC
INT
PB
-20 dB
-60 dB
J2
J3
R1 (PATTERN SIDE)
CN4 S-VHS VIDEO OUTPUT CONNECTOR
CN3 G/L IN
CN2 VIDEO OUT
SW1 AUDIO LEVEL SELECTION SWITCH
SW2 AUDIO MONITOR SELECTION SWITCH
SW3 VTR VIDEO OUTPUT SELECTION SWITCH
SW4 VTR COMPATIBILITY SWITCH
Ⓑ
Ⓒ
Ⓓ
COMPONENT SIDE
PATTERN SIDE

SCHEMATIC DIAGRAM OF MOTHER BOARD FOR CAMERA ADAPTOR

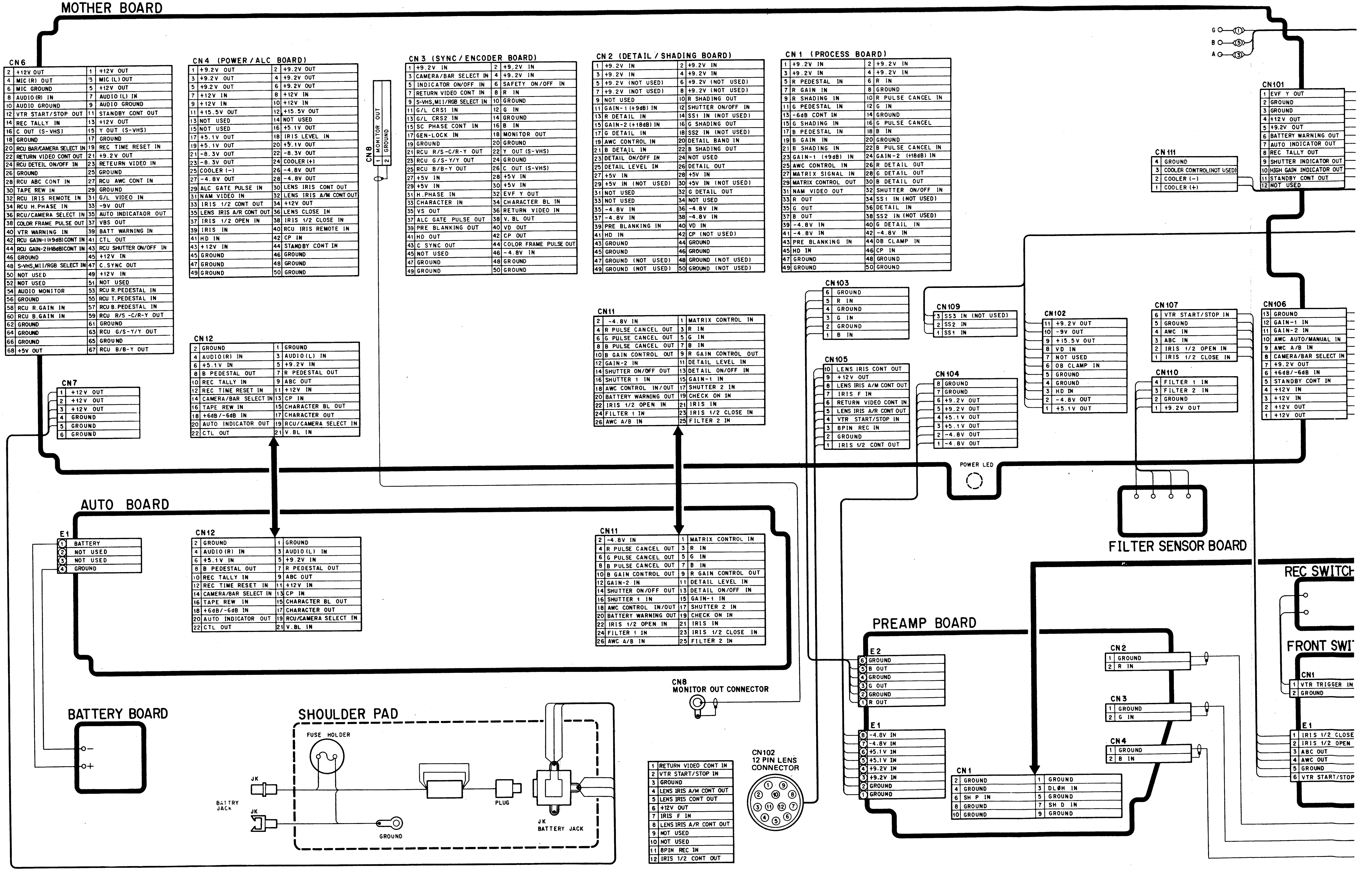


MOTHER BOARD
CN1
AUDIO LEVEL SELECT OUT 1
PLAYBACK AUDIO-3 OUT 2
BATT WARNING OUT 3
PB1 OUT 4
AUDIO MONITOR SELECT OUT 5
AUDIO LEVEL CONT OUT 6
AUDIO IN 7
PLAYBACK AUDIO-1 OUT 8
AUDIO (+) IN 9
AUDIO MONITOR IN 10
G/L VIDEO OUT 11
+12V OUT 12
VTR START ⊕2 IN 13
+12V OUT 14
VTR START ⊕1 IN 15
+12V OUT 16
VTR START ⊖ IN 17
+12V OUT 18
REC TALLY OUT 19
+8.8V OUT 20
RCU IRIS REMOTE OUT 21
+8.8V OUT 22
GROUND 23
+8V IN 24
GROUND 25
+8V IN 26
AUTO INDICATOR IN 27
AUDIO GROUND 28
INCOM MIC IN 29
AUDIO GROUND 30
INCOM MIC OUT 31
GROUND 32
REC TALLY IN 33
GROUND 34
GROUND 35
+5V IN 36
GROUND 37
+5V IN 38
SERIAL CONTROL OUT 39
+8.4V IN 40
GROUND 41
+8.4V IN 42
SERIAL DATA OUT 43
GROUND 44
GROUND 45
Y IN 46
GROUND 47
GROUND 48
NOT USED 49
B/B-Y/B OUT 50
VIDEO IN/OUT 51
GROUND 52
AUX OUT 53
C IN (MI) 54
+8.4V OUT 55
GROUND 56
C IN 57
Y IN 58
VIDEO IN 59
GROUND 60
TO MAIN BOARD
---CN 1
F101 3.15A
+12V
+8.8V
+8V
R80 10
+5V
+8.4V
R207 1K
R179 68
R180 68
CN3
C OUT (S-VHS) 1
GROUND 2
Y OUT (S-VHS) 3
GROUND 4
CN7
VTR START TRIGGER IN 1
VTR START ⊖ OUT 2
VTR START ⊕1 OUT 3
AUDIO MONITOR SELECT IN 4
AUDIO LEVEL SELECT IN 5
VTR START ⊕2 OUT 6
+8.8V OUT 7
+8.8V
CN5
Y OUT 1
GROUND 2
C IN 3
GROUND 4
VIDEO OUT 5
GROUND 6
VIDEO IN 7
GROUND 8
C IN 9
GROUND 10
CN4
CN4 S-VHS VIDEO OUTPUT CONNECTOR
(TOP VIEW)
SWITCH BOARD
E2
E3
E1
J1
J2
J3
SW4 VTR COMPATIBILITY SWITCH
⊕1
⊕2
⊖1
SW1 AUDIO LEVEL SELECTION SWITCH
SW2
INT
PB
SW1
-20 dB
-60 dB
SW2 AUDIO MONITOR SELECTION SWITCH
SW3
ENC
YC
SW 3 VTR VIDEO OUTPUT SELECTION SWITCH
CN9
+8V
1 +8V OUT
2 REC TALLY OUT
3 INCOM MIC IN
4 MIC GROUND
5 AUDIO GROUND
6 AUDIO MONITOR OUT
7 AUDIO GROUND
8 AUDIO LEVEL CONT IN
9 AUDIO OUT
10 GROUND
11 RCU INCOM SPEAKER OUT
J185
J184
CN4
1 PLAYBACK AUDIO OUT
2 AUDIO GROUND
3 PLAYBACK AUDIO-3 IN
4 AUDIO GROUND
5 PB1 IN
6 AUDIO GROUND
7 PLAYBACK AUDIO-1 IN
8 AUDIO GROUND
9 GROUND
10 NOT USED
11 +8.4V IN
12 +8.4V OUT
CN2
+12V
1 +12V OUT
2 +12V OUT
3 GROUND
4 GROUND
5 GROUND
6 G/L VIDEO OUT
CN6
1 GROUND
2 G/L VIDEO IN
CN8
R181 68
1 VIDEO OUT
2 GROUND
CN10
+12V
1 +12V OUT
2 +12V OUT
3 +12V IN
4 +12V IN
BREAKER
A
B
CN14
1 GROUND
2 GROUND
CN13
R229 75
1 GROUND
2 G/L VIDEO IN
3 GROUND
4 GROUND
5 VTR BATT WARNING IN
6 AUDIO GROUND
7 AUDIO (-) OUT
8 AUDIO (+) OUT
9 AUDIO GROUND
10 PLAYBACK AUDIO IN
C1 33P
CN11
1 GROUND
2 R/R-Y/C OUT
3 GROUND
4 AUX IN
5 GROUND
6 VIDEO IN/OUT
7 GROUND
8 B/B-Y/B OUT
9 GROUND
10 G/Y₁/Y₂ OUT
11 GROUND
12 VIDEO (RCU) OUT
13 C OUT
R182 68
R183 68
CN12
1 GROUND
2 SERIAL CONTROL IN
3 SERIAL DATA IN
4 INCOM MIC OUT
5 AUDIO INDICATOR OUT
6 RCU IRIS REMOTE IN
7 REC TALLY IN
8 RCU INCOM SPEAKER IN
9 VTR START TRIGGER OUT
10 +12V IN
11 +12V IN
12 +12V IN
+12V

SCHEMATIC DIAGRAM OF MOTHER BOARD FOR CAMERA ADAPTOR


MOTHER BOARD
AUDIO BOARD
CN1
AUDIO LEVEL SELECT OUT 1
PLAYBACK AUDIO-3 OUT 2
BATT WARNING OUT 3
PB1 OUT 4
AUDIO MONITOR SELECT OUT 5
AUDIO LEVEL CONT OUT 6
AUDIO IN 7
PLAYBACK AUDIO-1 OUT 8
AUDIO (+) IN 9
AUDIO MONITOR IN 10
G/L VIDEO OUT 11
+12V OUT 12
VTR START ⊕2 IN 13
+12V OUT 14
VTR START ⊕1 IN 15
+12V OUT 16
VTR START ⊖ IN 17
+12V OUT 18
REC TALLY OUT 19
+8.8V OUT 20
RCU IRIS REMOTE OUT 21
+8.8V OUT 22
GROUND 23
+8V IN 24
GROUND 25
+8V IN 26
AUTO INDICATOR IN 27
AUDIO GROUND 28
INCOM MIC IN 29
AUDIO GROUND 30
INCOM MIC OUT 31
GROUND 32
REC TALLY IN 33
GROUND 34
GROUND 35
+5V IN 36
GROUND 37
+5V IN 38
SERIAL CONTROL OUT 39
+8.4V IN 40
GROUND 41
+8.4V IN 42
SERIAL DATA OUT 43
GROUND 44
GROUND 45
Y IN 46
GROUND 47
GROUND 48
NOT USED 49
B/B-Y/B OUT 50
VIDEO IN/OUT 51
GROUND 52
AUX OUT 53
C IN (MII) 54
+8.4V OUT 55
GROUND 56
C IN 57
Y IN 58
VIDEO IN 59
GROUND 60
TO MAIN BOARD ---CN 1
F101 3.15A
+12V
+8.8V
+8V
R80 10
+5V
+8.4V
R207 1K
R179 68
R180 68
CN3
C OUT (S-VHS) 1
GROUND 2
Y OUT (S-VHS) 3
GROUND 4
CN7
VTR START TRIGGER IN 1
VTR START ⊖ OUT 2
VTR START ⊕1 OUT 3
AUDIO MONITOR SELECT IN 4
AUDIO LEVEL SELECT IN 5
VTR START ⊕2 OUT 6
+8.8V OUT 7
+8.8V
CN5
Y OUT 1
GROUND 2
C IN 3
GROUND 4
VIDEO OUT 5
GROUND 6
VIDEO IN 7
GROUND 8
C IN 9
GROUND 10
+8V
CN9
+8V OUT 1
REC TALLY OUT 2
INCOM MIC IN 3
MIC GROUND 4
AUDIO GROUND 5
AUDIO MONITOR OUT 6
AUDIO GROUND 7
AUDIO LEVEL CONT IN 8
AUDIO OUT 9
GROUND 10
RCU INCOM SPEAKER OUT 11
J185
J184
CN4
PLAYBACK AUDIO OUT 1
AUDIO GROUND 2
PLAYBACK AUDIO-3 IN 3
AUDIO GROUND 4
PB1 IN 5
AUDIO GROUND 6
PLAYBACK AUDIO-1 IN 7
AUDIO GROUND 8
GROUND 9
NOT USED 10
+8.4V IN 11
+8.4V OUT 12
CN2
+12V
+12V OUT 1
+12V OUT 2
GROUND 3
GROUND 4
GROUND 5
G/L VIDEO OUT 6
E10
E9
E8
E7
E11
TO 68PIN CONNECTOR BOARD
CN6
GROUND 1
G/L VIDEO IN 2
R181 68
CN8
VIDEO OUT 1
GROUND 2
CN10
+12V
+12V OUT 1
+12V OUT 2
+12V IN 3
+12V IN 4
BREAKER
A
B
CN14
GROUND 1
GROUND 2
CN13
GROUND 1
G/L VIDEO IN 2
GROUND 3
GROUND 4
VTR BATT WARNING IN 5
AUDIO GROUND 6
AUDIO (−) OUT 7
AUDIO (+) OUT 8
AUDIO GROUND 9
PLAYBACK AUDIO IN 10
R229 75
C1 33P
CN11
GROUND 1
R/R-Y/C OUT 2
GROUND 3
AUX IN 4
GROUND 5
VIDEO IN/OUT 6
GROUND 7
B/B-Y/B OUT 8
GROUND 9
G/Y1/Y2 OUT 10
GROUND 11
VIDEO (RCU) OUT 12
C OUT 13
R182 68
R183 68
CN12
GROUND 1
SERIAL CONTROL IN 2
SERIAL DATA IN 3
INCOM MIC OUT 4
AUDIO INDICATOR OUT 5
RCU IRIS REMOTE IN 6
REC TALLY IN 7
RCU INCOM SPEAKER IN 8
VTR START TRIGGER OUT 9
+12V IN 10
+12V IN 11
+12V IN 12
+12V
BT1(E1)
R1 330
J1
R2 75K
VR1 AUDIO MONITOR/INTERCOM LEVEL CONTROL
D1 RECORDING/TALLY INDICATOR
JK2 INTERCOM JACK
JK1 AUDIO MONITOR JACK
CN3 GEN-LOCK INPUT CONNECTOR
CN2 VIDEO OUTPUT CONNECTOR
RCU/VTR
BATT/EXT DC
SW1 POWER SELECTION SWITCH
JK1 BATTERY CONNECTOR
CN1 EXTERNAL DC INPUT CONNECTOR
CN5 VTR/RCU CONNECTOR

WIRING DIAGRAM



CN6

2	+12V OUT	1	+12V OUT
4	MIC (R) OUT	3	MIC (L) OUT
6	MIC GROUND	5	+12V OUT
8	AUDIO (R) IN	7	AUDIO (L) IN
10	AUDIO GROUND	9	AUDIO GROUND
12	VTR START/STOP OUT	11	STANDBY CONT OUT
14	REC TALLY IN	13	+12V OUT
16	C OUT (S-VHS)	15	Y OUT (S-VHS)
18	GROUND	17	GROUND
20	RCU BAR/CAMERA SELECT IN	19	REC TIME RESET IN
22	RETURN VIDEO CONT OUT	21	+9.2V OUT
24	RCU DETEIL ON/OFF IN	23	RETEURN VIDEO IN
26	GROUND	25	GROUND
28	RCU ABC CONT IN	27	RCU AWC CONT IN
30	TAPE REW IN	29	GROUND
32	RCU IRIS REMOTE IN	31	G/L VIDEO IN
34	RCU H.PHASE IN	33	-9V OUT
36	RCU/CAMERA SELECT IN	35	AUTO INDICATAOR OUT
38	COLOR FRAME PULSE OUT	37	VBS OUT
40	VTR WARNING IN	39	BATT WARNING IN
42	RCU GAIN-1 (+9dB) CONT IN	41	CTL OUT
44	RCU GAIN-2 (+18dB) CONT IN	43	RCU SHUTTER ON/OFF IN
46	GROUND	45	+12V IN
48	S-VHS,MII/RGB SELECT IN	47	C.SYNC OUT
50	NOT USED	49	+12V IN
52	NOT USED	51	NOT USED
54	AUDIO MONITOR	53	RCU R.PEDESTAL IN
56	GROUND	55	RCU T.PEDESTAL IN
58	RCU R.GAIN IN	57	RCU B.PEDESTAL IN
60	RCU B.GAIN IN	59	RCU R/S -C/R-Y OUT
62	GROUND	61	GROUND
64	GROUND	63	RCU G/S-Y/Y OUT
66	GROUND	65	GROUND
68	+5V OUT	67	RCU B/B-Y OUT

CN4 (POWER / ALC BOARD)

1	+9.2V OUT	2	+9.2V OUT
3	+9.2V OUT	4	+9.2V OUT
5	+9.2V OUT	6	+9.2V OUT
7	+12V IN	8	+12V IN
9	+12V IN	10	+12V IN
11	+15.5V OUT	12	+15.5V OUT
13	NOT USED	14	NOT USED
15	NOT USED	16	+5.1V OUT
17	+5.1V OUT	18	IRIS LEVEL IN
19	+5.1V OUT	20	+5.1V OUT
21	-8.3V OUT	22	-8.3V OUT
23	-8.3V OUT	24	COOLER (+)
25	COOLER (−)	26	-4.8V OUT
27	-4.8V OUT	28	-4.8V OUT
29	ALC GATE PULSE IN	30	LENS IRIS CONT OUT
31	NAM VIDEO IN	32	LENS IRIS A/M CONT OUT
33	IRIS 1/2 CONT OUT	34	+12V OUT
35	LENS IRIS A/R CONT OUT	36	LENS CLOSE IN
37	IRIS 1/2 OPEN IN	38	IRIS 1/2 CLOSE IN
39	IRIS IN	40	RCU IRIS REMOTE IN
41	HD IN	42	CP IN
43	+12V IN	44	STANDBY CONT IN
45	GROUND	46	GROUND
47	GROUND	48	GROUND
49	GROUND	50	GROUND

CN8

1	MONITOR OUT
2	GROUND

CN 3 (SYNC / ENCODER BOARD)

1	+9.2V IN	2	+9.2V IN
3	CAMERA/BAR SELECT IN	4	+9.2V IN
5	INDICATOR ON/OFF IN	6	SAFETY ON/OFF IN
7	RETURN VIDEO CONT IN	8	R IN
9	S-VHS,MII/RGB SELECT IN	10	GROUND
11	G/L CRS1 IN	12	G IN
13	G/L CRS2 IN	14	GROUND
15	SC PHASE CONT IN	16	B IN
17	GEN-LOCK IN	18	MONITOR OUT
19	GROUND	20	GROUND
21	RCU R/S-C/R-Y OUT	22	Y OUT (S-VHS)
23	RCU G/S-Y/Y OUT	24	GROUND
25	RCU B/B-Y OUT	26	C OUT (S-VHS)
27	+5V IN	28	+5V IN
29	+5V IN	30	+5V IN
31	H.PHASE IN	32	EVF Y OUT
33	CHARACTER IN	34	CHARACTER BL IN
35	VS OUT	36	RETURN VIDEO IN
37	ALC GATE PULSE OUT	38	V. BL OUT
39	PRE BLANKING OUT	40	VD OUT
41	HD OUT	42	CP OUT
43	C SYNC OUT	44	COLOR FRAME PULSE OUT
45	NOT USED	46	-4.8V IN
47	GROUND	48	GROUND
49	GROUND	50	GROUND

CN 2 (DETAIL / SHADING BOARD)

1	+9.2V IN	2	+9.2V IN
3	+9.2V IN	4	+9.2V IN
5	+9.2V (NOT USED)	6	+9.2V (NOT USED)
7	+9.2V (NOT USED)	8	+9.2V (NOT USED)
9	NOT USED	10	R SHADING OUT
11	GAIN-1 (+9dB) IN	12	SHUTTER ON/OFF IN
13	R DETAIL IN	14	SS1 IN (NOT USED)
15	GAIN-2 (+18dB) IN	16	G SHADING OUT
17	G DETAIL IN	18	SS2 IN (NOT USED)
19	AWC CONTROL IN	20	DETAIL BAND IN
21	B DETAIL IN	22	B SHADING OUT
23	DETAIL ON/OFF IN	24	NOT USED
25	DETAIL LEVEL IN	26	DETAIL OUT
27	+5V IN	28	+5V IN
29	+5V IN (NOT USED)	30	+5V IN (NOT USED)
31	NOT USED	32	G DETAIL OUT
33	NOT USED	34	NOT USED
35	-4.8V IN	36	-4.8V IN
37	-4.8V IN	38	-4.8V IN
39	PRE BLANKING IN	40	VD IN
41	HD IN	42	CP (NOT USED)
43	GROUND	44	GROUND
45	GROUND	46	GROUND
47	GROUND (NOT USED)	48	GROUND (NOT USED)
49	GROUND (NOT USED)	50	GROUND (NOT USED)

CN 1 (PROCESS BOARD)

1	+9.2V IN	2	+9.2V IN
3	+9.2V IN	4	+9.2V IN
5	R PEDESTAL IN	6	R IN
7	R GAIN IN	8	GROUND
9	R SHADING IN	10	R PULSE CANCEL IN
11	G PEDESTAL IN	12	G IN
13	-6dB CONT IN	14	GROUND
15	G SHADING IN	16	G PULSE CANCEL
17	B PEDESTAL IN	18	B IN
19	B GAIN IN	20	GROUND
21	B SHADING IN	22	B PULSE CANCEL IN
23	GAIN-1 (+9dB) IN	24	GAIN-2 (+18dB) IN
25	AWC CONTROL IN	26	R DETAIL OUT
27	MATRIX SIGNAL IN	28	G DETAIL OUT
29	MATRIX CONTROL OUT	30	B DETAIL OUT
31	NAM VIDEO OUT	32	SHUTTER ON/OFF IN
33	R OUT	34	SS1 IN (NOT USED)
35	G OUT	36	DETAIL IN
37	B OUT	38	SS2 IN (NOT USED)
39	-4.8V IN	40	G DETAIL IN
41	-4.8V IN	42	-4.8V IN
43	PRE BLANKING IN	44	OB CLAMP IN
45	HD IN	46	CP IN
47	GROUND	48	GROUND
49	GROUND	50	GROUND

CN101

1	EVF Y OUT
2	GROUND
3	GROUND
4	+12V OUT
5	+9.2V OUT
6	BATTERY WARNING OUT
7	AUTO INDICATOR OUT
8	REC TALLY OUT
9	SHUTTER INDICATOR OUT
10	HIGH GAIN INDICATOR OUT
11	STANDBY CONT OUT
12	NOT USED

CN 111

4	GROUND
3	COOLER CONTROL(NOT USED)
2	COOLER (−)
1	COOLER (+)

CN7

1	+12V OUT
2	+12V OUT
3	+12V OUT
4	GROUND
5	GROUND
6	GROUND

CN12

2	GROUND	1	GROUND
4	AUDIO (R) IN	3	AUDIO (L) IN
6	+5.1V IN	5	+9.2V IN
8	B PEDESTAL OUT	7	R PEDESTAL OUT
10	REC TALLY IN	9	ABC OUT
12	REC TIME RESET IN	11	+12V IN
14	CAMERA/BAR SELECT IN	13	CP IN
16	TAPE REW IN	15	CHARACTER BL OUT
18	+6dB/-6dB IN	17	CHARACTER OUT
20	AUTO INDICATOR OUT	19	RCU/CAMERA SELECT IN
22	CTL OUT	21	V.BL IN

CN11

2	-4.8V IN	1	MATRIX CONTROL IN
4	R PULSE CANCEL OUT	3	R IN
6	G PULSE CANCEL OUT	5	G IN
8	B PULSE CANCEL OUT	7	B IN
10	B GAIN CONTROL OUT	9	R GAIN CONTROL OUT
12	GAIN-2 IN	11	DETAIL LEVEL IN
14	SHUTTER ON/OFF OUT	13	DETAIL ON/OFF IN
16	SHUTTER 1 IN	15	GAIN-1 IN
18	AWC CONTROL IN/OUT	17	SHUTTER 2 IN
20	BATTERY WARNING OUT	19	CHECK ON IN
22	IRIS 1/2 OPEN IN	21	IRIS IN
24	FILTER 1 IN	23	IRIS 1/2 CLOSE IN
26	AWC A/B IN	25	FILTER 2 IN

CN103

6	GROUND
5	R IN
4	GROUND
3	G IN
2	GROUND
1	B IN

CN109

3	SS3 IN (NOT USED)
2	SS2 IN
1	SS1 IN

CN102

11	+9.2V OUT
10	-9V OUT
9	+15.5V OUT
8	VD IN
7	NOT USED
6	OB CLAMP IN
5	GROUND
4	GROUND
3	HD IN
2	-4.8V OUT
1	+5.1V OUT

CN107

6	VTR START/STOP IN
5	GROUND
4	AWC IN
3	ABC IN
2	IRIS 1/2 OPEN IN
1	IRIS 1/2 CLOSE IN

CN106

13	GROUND
12	GAIN-1 IN
11	GAIN-2 IN
10	AWC AUTO/MANUAL IN
9	AWC A/B IN
8	CAMERA/BAR SELECT IN
7	+9.2V OUT
6	+6dB/-6dB IN
5	STANDBY CONT IN
4	+12V IN
3	+12V IN
2	+12V OUT
1	+12V OUT

CN105

10	LENS IRIS CONT OUT
9	+12V OUT
8	LENS IRIS A/M CONT OUT
7	IRIS F IN
6	RETURN VIDEO CONT IN
5	LENS IRIS A/R CONT OUT
4	VTR START/STOP IN
3	8PIN REC IN
2	GROUND
1	IRIS 1/2 CONT OUT

CN104

8	GROUND
7	GROUND
6	+9.2V OUT
5	+9.2V OUT
4	+5.1V OUT
3	+5.1V OUT
2	-4.8V OUT
1	-4.8V OUT

CN110

4	FILTER 1 IN
3	FILTER 2 IN
2	GROUND
1	+9.2V OUT

E1

①	BATTERY
②	NOT USED
③	NOT USED
④	GROUND

CN12

2	GROUND	1	GROUND
4	AUDIO (R) IN	3	AUDIO (L) IN
6	+5.1V IN	5	+9.2V IN
8	B PEDESTAL OUT	7	R PEDESTAL OUT
10	REC TALLY IN	9	ABC OUT
12	REC TIME RESET IN	11	+12V IN
14	CAMERA/BAR SELECT IN	13	CP IN
16	TAPE REW IN	15	CHARACTER BL OUT
18	+6dB/-6dB IN	17	CHARACTER OUT
20	AUTO INDICATOR OUT	19	RCU/CAMERA SELECT IN
22	CTL OUT	21	V.BL IN

CN11

2	-4.8V IN	1	MATRIX CONTROL IN
4	R PULSE CANCEL OUT	3	R IN
6	G PULSE CANCEL OUT	5	G IN
8	B PULSE CANCEL OUT	7	B IN
10	B GAIN CONTROL OUT	9	R GAIN CONTROL OUT
12	GAIN-2 IN	11	DETAIL LEVEL IN
14	SHUTTER ON/OFF OUT	13	DETAIL ON/OFF IN
16	SHUTTER 1 IN	15	GAIN-1 IN
18	AWC CONTROL IN/OUT	17	SHUTTER 2 IN
20	BATTERY WARNING OUT	19	CHECK ON IN
22	IRIS 1/2 OPEN IN	21	IRIS IN
24	FILTER 1 IN	23	IRIS 1/2 CLOSE IN
26	AWC A/B IN	25	FILTER 2 IN

1	RETURN VIDEO CONT IN
2	VTR START/STOP IN
3	GROUND
4	LENS IRIS A/M CONT OUT
5	LENS IRIS CONT OUT
6	+12V OUT
7	IRIS F IN
8	LENS IRIS A/R CONT OUT
9	NOT USED
10	NOT USED
11	8PIN REC IN
12	IRIS 1/2 CONT OUT

E2

⑥	GROUND
⑤	B OUT
④	GROUND
③	G OUT
②	GROUND
①	R OUT

E1

⑧	-4.8V IN
⑦	-4.8V IN
⑥	+5.1V IN
⑤	+5.1V IN
④	+9.2V IN
③	+9.2V IN
②	GROUND
①	GROUND

CN1

2	GROUND	1	GROUND
4	GROUND	3	DL0H IN
6	SH P IN	5	GROUND
8	GROUND	7	SH D IN
10	GROUND	9	GROUND

CN2

1	GROUND
2	R IN

CN3

1	GROUND
2	G IN

CN4

1	GROUND
2	B IN

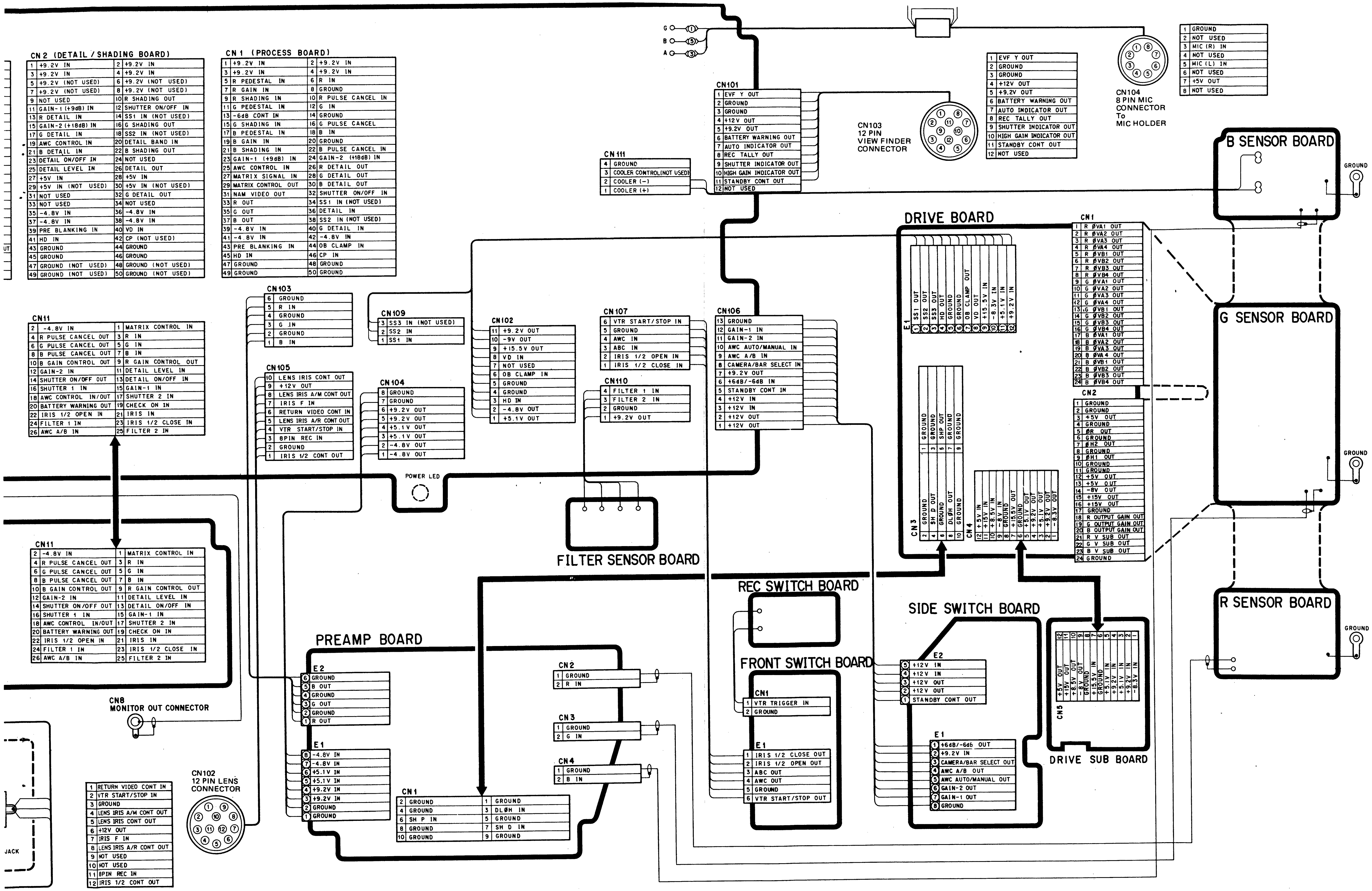
CN1

1	VTR TRIGGER IN
2	GROUND

E1

1	IRIS 1/2 CLOSE
2	IRIS 1/2 OPEN
3	ABC OUT
4	AWC OUT
5	GROUND
6	VTR START/STOP

WIRING DIAGRAM



CN 2 (DETAIL / SHADING BOARD)

1	+9.2V IN	2	+9.2V IN
3	+9.2V IN	4	+9.2V IN
5	+9.2V (NOT USED)	6	+9.2V (NOT USED)
7	+9.2V (NOT USED)	8	+9.2V (NOT USED)
9	NOT USED	10	R SHADING OUT
11	GAIN-1 (+9dB) IN	12	SHUTTER ON/OFF IN
13	R DETAIL IN	14	SS1 IN (NOT USED)
15	GAIN-2 (+18dB) IN	16	G SHADING OUT
17	G DETAIL IN	18	SS2 IN (NOT USED)
19	AWC CONTROL IN	20	DETAIL BAND IN
21	B DETAIL IN	22	B SHADING OUT
23	DETAIL ON/OFF IN	24	NOT USED
25	DETAIL LEVEL IN	26	DETAIL OUT
27	+5V IN	28	+5V IN
29	+5V IN (NOT USED)	30	+5V IN (NOT USED)
31	NOT USED	32	G DETAIL OUT
33	NOT USED	34	NOT USED
35	-4.8V IN	36	-4.8V IN
37	-4.8V IN	38	-4.8V IN
39	PRE BLANKING IN	40	VD IN
41	HD IN	42	CP (NOT USED)
43	GROUND	44	GROUND
45	GROUND	46	GROUND
47	GROUND (NOT USED)	48	GROUND (NOT USED)
49	GROUND (NOT USED)	50	GROUND (NOT USED)

CN 1 (PROCESS BOARD)

1	+9.2V IN	2	+9.2V IN
3	+9.2V IN	4	+9.2V IN
5	R PEDESTAL IN	6	R IN
7	R GAIN IN	8	GROUND
9	R SHADING IN	10	R PULSE CANCEL IN
11	G PEDESTAL IN	12	G IN
13	-6dB CONT IN	14	GROUND
15	G SHADING IN	16	G PULSE CANCEL
17	B PEDESTAL IN	18	B IN
19	B GAIN IN	20	GROUND
21	B SHADING IN	22	B PULSE CANCEL IN
23	GAIN-1 (+9dB) IN	24	GAIN-2 (+18dB) IN
25	AWC CONTROL IN	26	R DETAIL OUT
27	MATRIX SIGNAL IN	28	G DETAIL OUT
29	MATRIX CONTROL OUT	30	B DETAIL OUT
31	NAM VIDEO OUT	32	SHUTTER ON/OFF IN
33	R OUT	34	SS1 IN (NOT USED)
35	G OUT	36	DETAIL IN
37	B OUT	38	SS2 IN (NOT USED)
39	-4.8V IN	40	G DETAIL IN
41	-4.8V IN	42	-4.8V IN
43	PRE BLANKING IN	44	OB CLAMP IN
45	HD IN	46	CP IN
47	GROUND	48	GROUND
49	GROUND	50	GROUND

CN101

1	EVF Y OUT
2	GROUND
3	GROUND
4	+12V OUT
5	+9.2V OUT
6	BATTERY WARNING OUT
7	AUTO INDICATOR OUT
8	REC TALLY OUT
9	SHUTTER INDICATOR OUT
10	HIGH GAIN INDICATOR OUT
11	STANDBY CONT OUT
12	NOT USED

CN 111

4	GROUND
3	COOLER CONTROL(NOT USED)
2	COOLER (−)
1	COOLER (+)

CN103
12 PIN
VIEW FINDER
CONNECTOR

1	EVF Y OUT
2	GROUND
3	GROUND
4	+12V OUT
5	+9.2V OUT
6	BATTERY WARNING OUT
7	AUTO INDICATOR OUT
8	REC TALLY OUT
9	SHUTTER INDICATOR OUT
10	HIGH GAIN INDICATOR OUT
11	STANDBY CONT OUT
12	NOT USED

CN104
8 PIN MIC
CONNECTOR
To
MIC HOLDER

1	GROUND
2	NOT USED
3	MIC (R) IN
4	NOT USED
5	MIC (L) IN
6	NOT USED
7	+5V OUT
8	NOT USED

CN11

2	-4.8V IN	1	MATRIX CONTROL IN
4	R PULSE CANCEL OUT	3	R IN
6	G PULSE CANCEL OUT	5	G IN
8	B PULSE CANCEL OUT	7	B IN
10	B GAIN CONTROL OUT	9	R GAIN CONTROL OUT
12	GAIN-2 IN	11	DETAIL LEVEL IN
14	SHUTTER ON/OFF OUT	13	DETAIL ON/OFF IN
16	SHUTTER 1 IN	15	GAIN-1 IN
18	AWC CONTROL IN/OUT	17	SHUTTER 2 IN
20	BATTERY WARNING OUT	19	CHECK ON IN
22	IRIS 1/2 OPEN IN	21	IRIS IN
24	FILTER 1 IN	23	IRIS 1/2 CLOSE IN
26	AWC A/B IN	25	FILTER 2 IN

CN103

6	GROUND
5	R IN
4	GROUND
3	G IN
2	GROUND
1	B IN

CN109

3	SS3 IN (NOT USED)
2	SS2 IN
1	SS1 IN

CN105

10	LENS IRIS CONT OUT
9	+12V OUT
8	LENS IRIS A/M CONT OUT
7	IRIS F IN
6	RETURN VIDEO CONT IN
5	LENS IRIS A/R CONT OUT
4	VTR START/STOP IN
3	8PIN REC IN
2	GROUND
1	IRIS 1/2 CONT OUT

CN104

8	GROUND
7	GROUND
6	+9.2V OUT
5	+9.2V OUT
4	+5.1V OUT
3	+5.1V OUT
2	-4.8V OUT
1	-4.8V OUT

CN102

11	+9.2V OUT
10	-9V OUT
9	+15.5V OUT
8	VD IN
7	NOT USED
6	OB CLAMP IN
5	GROUND
4	GROUND
3	HD IN
2	-4.8V OUT
1	+5.1V OUT

CN107

6	VTR START/STOP IN
5	GROUND
4	AWC IN
3	ABC IN
2	IRIS 1/2 OPEN IN
1	IRIS 1/2 CLOSE IN

CN110

4	FILTER 1 IN
3	FILTER 2 IN
2	GROUND
1	+9.2V OUT

CN106

13	GROUND
12	GAIN-1 IN
11	GAIN-2 IN
10	AWC AUTO/MANUAL IN
9	AWC A/B IN
8	CAMERA/BAR SELECT IN
7	+9.2V OUT
6	+6dB/-6dB IN
5	STANDBY CONT IN
4	+12V IN
3	+12V IN
2	+12V OUT
1	+12V OUT

E1

①	SS1 OUT
②	SS2 OUT
③	SS3 OUT
④	HD OUT
⑤	GROUND
⑥	GROUND
⑦	OB CLAMP OUT
⑧	VD OUT
⑨	+15.5V IN
⑩	-8.3V IN
⑪	+5.1V IN
⑫	+9.2V IN

CN3

1	GROUND	2	GROUND
3	GROUND	4	SH D OUT
5	SHP OUT	6	GROUND
7	GROUND	8	DLØH OUT
9	GROUND	10	GROUND

CN4

12	+5V IN
11	+15V IN
10	+8.5V IN
9	-8V IN
8	GROUND
7	+15.5V OUT
6	GROUND
5	+5.1V OUT
4	+9.2V OUT
3	+5.1V OUT
2	+9.2V OUT
1	-8.3V OUT

CN1

1	R ØVA1 OUT
2	R ØVA2 OUT
3	R ØVA3 OUT
4	R ØVA4 OUT
5	R ØVB1 OUT
6	R ØVB2 OUT
7	R ØVB3 OUT
8	R ØVB4 OUT
9	G ØVA1 OUT
10	G ØVA2 OUT
11	G ØVA3 OUT
12	G ØVA4 OUT
13	G ØVB1 OUT
14	G ØVB2 OUT
15	G ØVB3 OUT
16	G ØVB4 OUT
17	B ØVA1 OUT
18	B ØVA2 OUT
19	B ØVA3 OUT
20	B ØVA4 OUT
21	B ØVB1 OUT
22	B ØVB2 OUT
23	B ØVB3 OUT
24	B ØVB4 OUT

CN2

1	GROUND
2	GROUND
3	+5V OUT
4	GROUND
5	ØR OUT
6	GROUND
7	ØH2 OUT
8	GROUND
9	ØH1 OUT
10	GROUND
11	GROUND
12	+5V OUT
13	+5V OUT
14	-8V OUT
15	+15V OUT
16	+15V OUT
17	GROUND
18	R OUTPUT GAIN OUT
19	G OUTPUT GAIN OUT
20	B OUTPUT GAIN OUT
21	R V SUB OUT
22	G V SUB OUT
23	B V SUB OUT
24	GROUND

CN11

2	-4.8V IN	1	MATRIX CONTROL IN
4	R PULSE CANCEL OUT	3	R IN
6	G PULSE CANCEL OUT	5	G IN
8	B PULSE CANCEL OUT	7	B IN
10	B GAIN CONTROL OUT	9	R GAIN CONTROL OUT
12	GAIN-2 IN	11	DETAIL LEVEL IN
14	SHUTTER ON/OFF OUT	13	DETAIL ON/OFF IN
16	SHUTTER 1 IN	15	GAIN-1 IN
18	AWC CONTROL IN/OUT	17	SHUTTER 2 IN
20	BATTERY WARNING OUT	19	CHECK ON IN
22	IRIS 1/2 OPEN IN	21	IRIS IN
24	FILTER 1 IN	23	IRIS 1/2 CLOSE IN
26	AWC A/B IN	25	FILTER 2 IN

CN8
MONITOR OUT CONNECTOR

1	RETURN VIDEO CONT IN
2	VTR START/STOP IN
3	GROUND
4	LENS IRIS A/M CONT OUT
5	LENS IRIS CONT OUT
6	+12V OUT
7	IRIS F IN
8	LENS IRIS A/R CONT OUT
9	NOT USED
10	NOT USED
11	8PIN REC IN
12	IRIS 1/2 CONT OUT

CN102
12 PIN LENS
CONNECTOR

E2

⑥	GROUND
⑤	B OUT
④	GROUND
③	G OUT
②	GROUND
①	R OUT

E1

⑧	-4.8V IN
⑦	-4.8V IN
⑥	+5.1V IN
⑤	+5.1V IN
④	+9.2V IN
③	+9.2V IN
②	GROUND
①	GROUND

CN1

2	GROUND	1	GROUND
4	GROUND	3	DLØH IN
6	SH P IN	5	GROUND
8	GROUND	7	SH D IN
10	GROUND	9	GROUND

CN2

1	GROUND
2	R IN

CN3

1	GROUND
2	G IN

CN4

1	GROUND
2	B IN

CN1

1	VTR TRIGGER IN
2	GROUND

E1

1	IRIS 1/2 CLOSE OUT
2	IRIS 1/2 OPEN OUT
3	ABC OUT
4	AWC OUT
5	GROUND
6	VTR START/STOP OUT

E2

⑤	+12V IN
④	+12V IN
③	+12V OUT
②	+12V OUT
①	STANDBY CONT OUT

E1

①	+6dB/-6dB OUT
②	+9.2V IN
③	CAMERA/BAR SELECT OUT
④	AWC A/B OUT
⑤	AWC AUTO/MANUAL OUT
⑥	GAIN-2 OUT
⑦	GAIN-1 OUT
⑧	GROUND

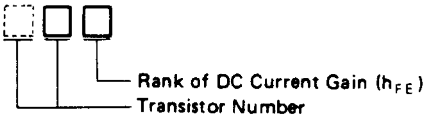
CN5

12	+5V OUT
11	+15V OUT
10	+8.5V OUT
9	-8V OUT
8	GROUND
7	+15.5V IN
6	GROUND
5	+5.1V IN
4	+9.2V IN
3	+5.1V IN
2	+9.2V IN
1	-8.3V IN

CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.


Rank of DC Current Gain (h_{FE})
Transistor Number

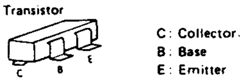
Transistor Number

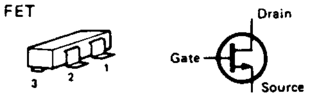
Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

Example

WQ ⟶ 2SD602 – Q
YQ ⟶ 2SD601 – Q
1BS ⟶ 2SB814 – S

Appearance and Symbols

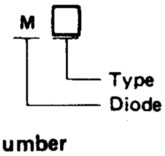

Transistor
C
B
E
C: Collector
B: Base
E: Emitter


FET
3
2
1
Drain
Gate
Source

	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

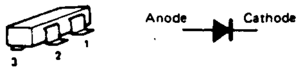
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.


M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

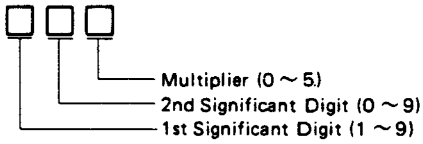
Appearance and Symbols


3
2
1
Anode
Cathode

	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.


Multiplier (0 ~ 5)
2nd Significant Digit (0 ~ 9)
1st Significant Digit (1 ~ 9)

EXAMPLE:

330 ⟶ 33×10^0 = 33 ohms
561 ⟶ 56×10^1 = 560 ohms
123 ⟶ 12×10^3 = 12 kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

4. Chip Capacitor

The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

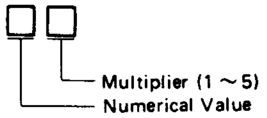
If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 ⟶ 0.5 pF
75 ⟶ 0.75 pF
1 ⟶ 1 pF

2.5 ⟶ 2.5 pF
33 ⟶ 33 pF
82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.


Multiplier (1 ~ 5)
Numerical Value

Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

Letters I and O are not used

EXAMPLE:

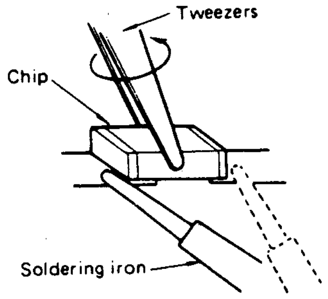
A1 ⟶ $10 \times 10^1 = 100$ pF
N2 ⟶ $33 \times 10^2 = 3300$ pF
S3 ⟶ $47 \times 10^3 = 47000$ pF

5. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

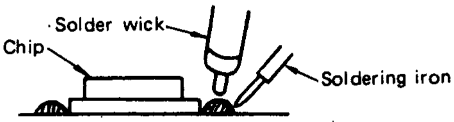
5-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below remove the chip by turning it with tweezers.
   Note Be careful not to damage other chips.

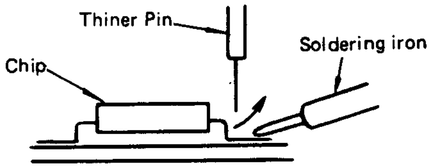

Tweezers
Chip
Soldering iron

5-2 Removal (IC)

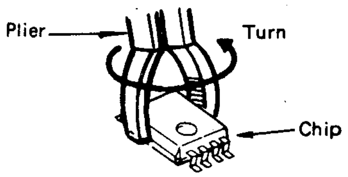
1. Add the solder wick and solder iron to each lead of the IC and remove solder.


Solder wick
Chip
Soldering iron

2. Add the solder iron to each lead of the IC and left each lead of the IC using thiner pin.

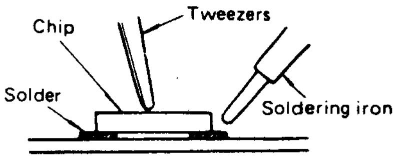

Thiner Pin
Chip
Soldering iron

3. Remove IC turning it with plier.

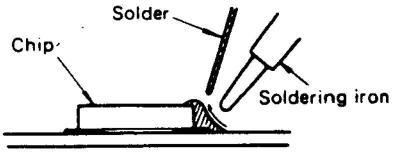

Plier
Turn
Chip

5-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.


Chip
Tweezers
Solder
Soldering iron

3. Solder both ends of chip (three leads for chip transistor)


Solder
Chip
Soldering iron

Service Manual

Vol. 4

PAL Colour Video Camera
WV-F350E Series

Replacement Parts List
Exploded View

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REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
2. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

MISCELLANEOUS

REF.NO.	PART NO.	DESCRIPTION
CF101	YW2643165451	Filter A
CF102	YWRISC4	Filter B
JK101	YWYAE329800A	Jack
CN101	31-10T	BNC Connector
CN102	HR10E10R12S	Lens Connector
CN103	YWDB201N628	EVF Connector
CN104	YWD7110N100	MIC Connector
M1	YWV0EA0110AN	Bayonet Mounting Assy
M2	YWV9AA0465AN	Filter Assy
M3	YWV0EA0142AN	CCD Assy
M4	YWV2KA0591A1	Optical Chassis
M5	YWV2KA0592A1	Front Chassis
M6	YWV7DA0199A4	Heat Sink A
M7	YWV7DA0252A4	Heat Sink B
M8	YWV7DA0253A4	Heat Sink C
M9	YWV7DA0258A4	Heat Sink D
M10	YWV4JA0146A4	Spring
M11	YWV2XA0087A4	Protector
M12	YWV1EA0110A4	Special Screw
M13	YWV2EA0051A4	Guide
M14	YWV1HA0025A4	Pin
M15	YWV2GA0065A4	Cord Clamp
M16	YWV2HB0841A2	Shield Parts
M17	YWV6JA0041A4	Button
M18	YWV7SA1232A2	Label
M19	YWV4FA0028B4	Bearing
M20	YWV2SA1638A4	Mounting Angle for Board
M21	YWV5EC0846A1	Left Side Cover
M22	YWV2HA0840A4	Shield Parts
M23	YWV2FA0465A4	Cushion A
M24	YWV2FB0465A4	Cushion B
M25 ⚠	YWV7QA2174A3	Main Label
M26	YWV7PA0070A4	Badge
M28	YWV5EA0847A1	Right Side Cover
M29	YWV7QA2175A3	Main Label
M30	YWV6EA0107B2	Preset Cover
M31	YWV5EA0699A3	Cover
M32	YWV4JA0156B4	Spring
M33	YWV5EA0698A3	Filter Cover
M34	YWV5VA0056A2	Pad
M35	YWV2PA0370A4	Insulator Sheet
M39	YWNK10N	Cord Clamp
M40	YWV5EB0697A1	Cover
M41	YWV6FA0066A3	Bracket
M42	YWV4JA0147A4	Spring
M43	YWV2EA0052A4	Guide
M44	YWV1EA0070A3	Special Screw
M45	YWV5MA0030A4	Shoe
M46	YWV1KA0039A4	Washer A
M47	YWV1KA0041A4	Washer B
M48	YWV2CA0278A4	Hold Plate
M49	YWV2CA0279A4	Hold Plate
M50	YWV9AA0312AN	Mechanical Ass'y
M51	YWV5EA0693A1	Cover
M52	YWV2EA0152A2	Guide
M53	YWV2SA1400A4	Mounting Angle
M54	YFV7MA0099A4	Safety Label
M55	YWV5EB0694A1	Cover
M56	YWV2EA0153A2	Guide
M57	YWV2SB1400A4	Mounting Angle
M58	YWV2SA1407A4	Mounting Angle
M59	YWV6GA0127A4	Plate
M60	YWV4JA0285A4	Spring
M61	YWV3CA0175A3	Parts Holder
M62	YWV6JC0056A4	Button
M63	YWV2SA1432A4	Mounting Angle
M64	YWV2NA0273A4	Spacer
M65	YWV2PA0369A4	Insulator
M66	YWV1HA0036A4	Pin
M67	YWV5RA0249A4	Knob
M68	YWV5RA0281A4	Knob
M69	YFV6JA0026A4	Button
M71	YWV2VA0043A3	Barrier
M72	YWV2VA0044A4	Barrier
M81	YWV2SA1631A3	Mounting Angle

DRIVE BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB1 (NLA)	YWVKBF350E3A	Printed Circuit Board Assy	
IC1	MN5137	IC	
IC2	MN5117	IC	
IC3	MN74HC367S	IC	
IC4	MN74HC08S	IC	
IC5	MN74HCU04S	IC	
IC7-12	YWUPD6147G	IC	
Q1	2SK662-PQR	FET	
Q2-7	2SD1819-QRS	Transistor	
Q18	2SD1328S	Transistor	
Q19	2SB1218-QRS	Transistor	
Q20	2SD1328S	Transistor	
Q21	2SB970-RS	Transistor	
Q22	2SD1328S	Transistor	
D1,2	MA141K	Diode	
D3,4	YW1SV73B	Diode	
R12-14	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R15	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R20	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R23	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R24	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R25	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R26	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R27	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R28	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R29	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R32	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R33	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R34	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R35,37	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R38	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R40	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R44	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R45	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R47,48	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R49	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R53	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R54	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R56,57	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R58	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R59,60	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R61	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R62	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R63	ERJ3GEYJ273	Carbon	27K ohms 1/16W
R64	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R65	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R66	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R67,68	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R69	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R70,71	ERJ3GEYJ273	Carbon	27K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R72	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R73	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R104,105	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R106	ERJ3GEYJ303	Carbon	30K ohms 1/16W
R107	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R108	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R109	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R110-112	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R113	ERJ3GEYJ511	Carbon	510 ohms 1/16W
R114	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R115	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R116	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R117	ERJ3GEYJ102	Carbon	1K ohms 1/16W
VR1,2	EVML3GA00B23	Variable Resistor	2K ohms
VR3-5	EVML3GA00B25	Variable Resistor	200K ohms
VR6-8	EVML3GA00B15	Variable Resistor	100K ohms
C1	YW5CH150J5VB	Ceramic	15 pF
C2	ECSF1AE476	Tantalum	47 µF 10V
C3	YW5F104Z2VB	Ceramic	0.1 µF
C4	ECSF1AE476	Tantalum	47 µF 10V
C5	YW5F104Z2VB	Ceramic	0.1 µF
C6	YW5CH470J5VB	Ceramic	47 pF
C7	YW5X103K2VB	Ceramic	0.01 µF
C8	ECSF1AE226	Tantalum	22 µF 10V
C9	YW5F104Z2VB	Ceramic	0.1 µF
C10,11	ECSF1AE476	Tantalum	47 µF 10V
C12,13	YW5F104Z2VB	Ceramic	0.1 µF
C14	ECSF1AE226	Tantalum	22 µF 10V
C15	YW5CH470J5VB	Ceramic	47 pF
C16	YW5CH300J5VB	Ceramic	30 pF
C17,18	YW5CH220J5VB	Ceramic	22 pF
C19	ECSF1AE226	Electrolytic	22 µF 10V
C20	YW5CH100J5VB	Ceramic	10 pF
C21	ECSF1AE226		22 µF 10V
C22,23	YW5CH330J5VB	Ceramic	33 pF
C24	ECEA1AKA101	Electrolytic	100 µF 10V
C25-30	ECEA1CKS100	Electrolytic	10 µF 16V
C31	ECEA1ES221	Electrolytic	220 µF 25V(SU)
C46	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C47	ECEA0JKS470	Electrolytic	47 µF 6.3V
C49	ECEA1CKA220	Electrolytic	22 µF 16V
C50,51	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C52	ECEA0JKS470	Electrolytic	47 µF 6.3V
C54	ECEA1CKA220	Electrolytic	22 µF 16V
C55	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C56,57	ECEA1EGE101	Electrolytic	100 µF 25V (SU)
C58	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C59	ECEA0JKS470	Electrolytic	47 µF 6.3V
C61	ECEA1CKA220	Electrolytic	22 µF 16V
C62,63	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C64	ECEA0JKS470	Electrolytic	47 µF 6.3V
C66	ECEA1CKA220	Electrolytic	22 µF 16V
C67	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C69	ECEA0JU102	Electrolytic	1000 µF 6.3V

REF.NO.	PART NO.	DESCRIPTION
C70	ECEA1AKA101	Electrolytic 100 µF 10V
C71	ECEA1AKS330	Electrolytic 33 µF 10V (KA)
C72	ECEA0JKS470	Electrolytic 47 µF 6.3V
C74	ECEA1CKA220	Electrolytic 22 µF 16V
C75,76	ECEA1AKS330	Electrolytic 33 µF 10V (KA)
C77	ECEA0JKS470	Electrolytic 47 µF 6.3V
C79	ECEA1CKA220	Electrolytic 22 µF 16V
C80	ECEA1AKS330	Electrolytic 33 µF 10V (KA)
C81-83	ECEA1AKA101	Electrolytic 100 µF 10V
C84	YW5CH470J5VB	Ceramic 47 pF
T1	EIC5EB007A	Coil
L1-3	ELJFA8R2MF	Coil 8.2 µH
L4,5	ELJFA8R2MF	Coil 8.2 µH
L8	ELJFA8R2MF	Coil 8.2 µH
CN1,2	YW520302410	24-pin Connector
CN3	PS10SDD4TS11	10-pin Connector
CN4	YW520221210	12-pin Connector
J9,10	ERJ8GCS0R00	Jumper Resistor
J17,19	ERJ3GEY0R00	Jumper Resistor
J22,30	ERJ3GEY0R00	Jumper Resistor
J31,39	ERJ3GEY0R00	Jumper Resistor
J42,50	ERJ3GEY0R00	Jumper Resistor
J52,55	ERJ3GEY0R00	Jumper Resistor
J120	ERJ3GEY0R00	Jumper Resistor
TP1-8	YW32BM5A	Test-pin

SYNC/ENCODER BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB2 (NLA)	YWVKZF350E2A	Printed Circuit Board Assy
IC1	MN74HC4049S	IC
IC2	MN4001BS	IC
IC3	MN74HC02S	IC
IC4	YWUPC4062G2	IC
IC5	YWMB87075D	LSI
IC6	YWTC7S00FR	IC
IC8	YWTC4S81FR	IC
IC9	YWMB623164	IC
IC10	YWTC4S66FR	IC
IC11	YWTC7S02FR	IC
IC12	YWTC7S04F	IC
IC13,14	YWTC4S71F	IC
IC20	YWTC4S81FR	IC
IC21	MN50005LVD	IC
IC23	NJU4053BM	IC
IC24	AN2254FAP	LSI
IC25	MN74HC4053S	IC
IC26	YWCX20095A	IC
IC27	NJU4053BM	IC
IC28,29	NJM2904M	IC
IC30	YWTC4S69F	IC
IC31	YWNJM2207M	IC
IC32	NJU4053BM	IC
Q1-3	2SD1819-QRS	Transistor

REF.NO.	PART NO.	DESCRIPTION
Q4	2SB1218-QRS	Transistor
Q5-7	2SD1819-QRS	Transistor
Q8	2SC3931-CD	Transistor
Q9	2SB1218-QRS	Transistor
Q10	2SC3931-CD	Transistor
Q11,12	2SB1218-QRS	Transistor
Q13	2SC3931-CD	Transistor
Q14	XN2401	Transistor
Q15	XN6501	Transistor
Q20-22	2SD1819-QRS	Transistor
Q23,24	2SC3931-CD	Transistor
Q25	2SB1218-QRS	Transistor
Q26	2SD1819-QRS	Transistor
Q27	2SB1218-QRS	Transistor
Q28	2SD1819-QRS	Transistor
Q29-33	2SC3931-CD	Transistor
Q34-37	2SD1819-QRS	Transistor
Q38-40	2SC3931-CD	Transistor
Q41	2SB1218-QRS	Transistor
Q42	2SD1819-QRS	Transistor
Q43	2SB1218-QRS	Transistor
Q44	2SD1819-QRS	Transistor
Q45	2SB1218-QRS	Transistor
Q46	2SD1819-QRS	Transistor
Q49-51	2SC3931-CD	Transistor
Q52	2SB1218-QRS	Transistor
Q53	2SD1819-QRS	Transistor
Q54	2SB1218-QRS	Transistor
Q55	2SD1819-QRS	Transistor
Q56	2SB1218-QRS	Transistor
Q57	2SD1819-QRS	Transistor
Q60	2SB1218-QRS	Transistor
Q61	2SD1819-QRS	Transistor
Q62	2SB793A-RS	Transistor
Q63,64	2SB1219-QRS	Transistor
Q65	2SC3929-RS	Transistor
Q66-68	2SD1819-QRS	Transistor
Q69	2SA1531-ST	Transistor
Q70	2SC3931-CD	Transistor
Q71-74	2SD1819-QRS	Transistor
Q75	2SB1218-QRS	Transistor
Q76,79	2SD1819-QRS	Transistor
Q80,81	2SD1819-QRS	Transistor
Q82	XN2501	Transistor
Q83-85	3SK157	FET
D1-3	YWFC54M	Diode
D12,14	MA141K	Diode
D15	MA141K	Diode
D16	MA141WA	Diode
D17-19	MA141K	Diode
D20	MA141WA	Diode
D21	MA165	Diode
D22-24	MA141K	Diode
R1	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R2,3	ERJ3GEYJ103	Carbon 10K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R4	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R5	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R6	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R7,8	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R9	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R10	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R11	ERJ3GEYJ224	Carbon	220K ohms 1/16W
R12	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R13	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R14	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R15	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R16,17	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R18	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R19	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R20	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R21,22	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R23,24	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R25	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R26	ERJ3GEYJ121	Carbon	120 ohms 1/16W
R27	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R28	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R29	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R30	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R31	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R32	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R33	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R34	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R35	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R36	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R37	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R38	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R39	YWR1220P223D	Metal	22K ohms
R40	ERJ3GEYJ224	Carbon	220K ohms 1/16W
R41	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R42	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R43	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R44	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R45	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R46	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R47	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R48	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R49	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R50	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R51	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R52	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R53	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R54	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R55-57	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R58	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R60	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R61	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R62	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R63	ERJ3GEYJ753	Carbon	75K ohms 1/16W
R65	ERJ3GEYJ683	Carbon	68K ohms 1/16W
R67	ERJ3GEYJ564	Carbon	560K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R68	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R70	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R71	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R75	ERJ3GEYJ334	Carbon	330K 1/16W
R76	ERJ3GEYJ224	Carbon	220K ohms 1/16W
R78	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R79	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R80,81	YWR1220P102D	Metal	1K ohms
R82	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R83	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R84	YWR1220P102D	Metal	1K ohms
R85	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R86-88	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R90	YWR1220P102D	Metal	1K ohms
R91	YWR1220P101D	Metal	100 ohms
R92	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R93,94	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R95	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R96	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R97	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R98	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R99	ERJ3GEYJ753	Carbon	75K ohms 1/16W
R100-105	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R106	YWR1220P273D	Metal	27K ohms
R107	YWR1220P181D	Metal	180 ohms
R108,109	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R111	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R112	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R114	YFR1220P392D	Metal	3.9K ohms
R115	YWR1220P183D	Metal	18K ohms
R200	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R202	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R203	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R206	YFR1220P113D	Metal	11K ohms
R207	R1220P621D	Metal	620 ohms
R208	YFR1220P113D	Metal	11K ohms
R209	R1220P621D	Metal	620 ohms
R210	YFR1220P113D	Metal	11K ohms
R211	R1220P621D	Metal	620 ohms
R212-214	YWR1220P152D	Metal	1.5K ohms
R215	YWR1220P332D	Metal	3.3K ohms
R216	YWR1220P241D	Metal	240 ohms
R217	YWR1220P182D	Metal	1.8K ohms
R218	YWR1220P912D	Metal	9.1K ohms
R219	YWR1220P561D	Metal	560 ohms
R220	YFR1220P222D	Metal	2.2K OHMS
R221	YWR1220P273D	Metal	27K ohms
R222	YFR1220P222D	Metal	2.2K OHMS
R223	YWR1220P562D	Metal	5.6K ohms
R224	ERJ3GEYJ563	Carbon	56K ohms 1/16W
R225	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R226	ERJ3GEYJ563	Carbon	56K ohms 1/16W
R227	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R229	YWR1220P561D	Metal	560 ohms
R230	YWR1220P221D	Metal	220 ohms

REF.NO.	PART NO.	DESCRIPTION	
R231	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R232	YWR1220P221D	Metal	220 ohms
R233	ERJ3GEYJ751	Carbon	750 ohms 1/16W
R234	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R235	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R236	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R237,238	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R239	ERJ3GEYJ242	Carbon	2.4K ohms 1/16W
R240	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R241	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R242	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R243	ERJ3GEYJ621	Carbon	620 ohms 1/16W
R244	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R245	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R246	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R248	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R249	ERJ3GEYJ621	Carbon	620 ohms 1/16W
R250	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R252	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R254	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R255	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R258	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R259	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R260,262	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R264,265	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R267	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R268	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R269	ERJ3GEYJ681	Carbon	680 ohms 1/16W
R270	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R272	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R273	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R274,275	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R276	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R277	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R278	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R280	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R281,282	YWR1220P332D	Metal	3.3K ohms
R283	YWR1220P750D	Metal	75 ohms
R284	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R285	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R286	ERJ3GEYJ124	Carbon	120K ohms 1/16W
R287	R1220P822D	Metal	8.2K ohms
R288	YWR1220P202D	Metal	2K ohms
R289	YWR1220P103D	Metal	10K ohms
R290	YWR1220P911D	Metal	910 ohms
R291	YWR1220P393D	Metal	39K ohms
R292	YWR1220P332D	Metal	3.3K ohms
R293	YWR1220P152D	Metal	1.5K ohms
R294	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R295	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R296	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R297	ERJ3GEYJ681	Carbon	680 ohms 1/16W
R298	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R299	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R300	ERJ3GEYJ202	Carbon	2K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R301	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R302	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R303	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R304	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R305	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R307,310	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R311	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R312	YWR1220P512D	Metal	5.1K ohms
R313	YFR1220P104D	Metal	100K ohms
R314	YWR1220P683D	Metal	68K ohms
R315	YWR1220P202D	Metal	2K ohms
R316	YWR1220P102D	Metal	1K ohms
R317	YWR1220P562D	Metal	5.6K ohms
R318	YWR1220P272D	Metal	2.7K ohms
R319	YWR1220P511D	Metal	510 ohms
R320	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R321	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R322	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R323	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R324	ERJ3GEYJ681	Carbon	680 ohms 1/16W
R325	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R326	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R327	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R328	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R329	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R330	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R331	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R332	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R333	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R334	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R335	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R339	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R340	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R341	YFR1220P113D	Metal	11K ohms
R342	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R343	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R344	R1220P123D	Metal	12K ohms
R345,346	YWR1220P103D	Metal	10K ohms
R347	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R348	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R349	YWR1220P562D	Metal	5.6K ohms
R350	YFR1220P222D	Metal	2.2K OHMS
R351	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R352	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R353	YFR1220P113D	Metal	11K ohms
R354	R1220P123D	Metal	12K ohms
R355,356	YWR1220P103D	Metal	10K ohms
R357	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R358	ERJ3GEYJ822	Carbon	8.2K ohms 1/16W
R359	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R360	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R362	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R363	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R364	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R365	ERJ3GEYJ103	Carbon	10K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION
R366,367	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W
R368	ERJ3GEYJ682	Carbon 6.8K ohms 1/16W
R369	ERJ3GEYJ113	Carbon 11K ohms 1/16W
R370	ERJ3GEYJ133	Carbon 13K ohms 1/16W
R371	ERJ3GEYJ202	Carbon 2K ohms 1/16W
R372	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W
R373	ERJ3GEYJ562	Carbon 5.6K ohms 1/16W
R375	ERJ3GEYJ682	Carbon 6.8K ohms 1/16W
R377,378	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R379	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W
R380,381	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R382	ERJ3GEYJ222	Carbon 2.2K ohms 1/16W
R383	ERJ3GEYJ563	Carbon 56K ohms 1/16W
R384	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R385	ERJ3GEYJ563	Carbon 56K ohms 1/16W
R386	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W
R387	ERJ3GEYJ334	Carbon 330K 1/16W
R388	ERJ3GEYJ181	Carbon 180 ohms 1/16W
R391	ERJ3GEYJ101	Carbon 100 ohms 1/16W
R394	ERJ3GEYJ153	Carbon 15K ohms 1/16W
R395-397	ERJ3GEYJ221	Carbon 220 ohms 1/16W
R398	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R399	ERJ3GEYJ471	Carbon 470 ohms 1/16W
R400	ERJ3GEYJ152	Carbon 1.5K ohms 1/16W
R407,408	ERJ3GEYJ104	Carbon 100K ohms 1/16W
R409	ERJ3GEYJ300	Carbon 30 ohms 1/16W
R410	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R411	ERJ3GEYJ152	Carbon 1.5K ohms 1/16W
R413	ERJ3GEYJ391	Carbon 390 ohms 1/16W
R414,415	YWR1220P221D	Metal 220 ohms
R416	YWR1220P102D	Metal 1K ohms
R417	ERJ3GEYJ182	Carbon 1.8K ohms 1/16W
R418	ERJ3GEYJ751	Carbon 750 ohms 1/16W
R419	ERJ3GEYJ682	Carbon 6.8K ohms 1/16W
R420	ERJ3GEYJ242	Carbon 2.4K ohms 1/16W
R421	YWR1220P102D	Metal 1K ohms
R423	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W
VR1	EVML3GA00B54	Variable Resistor 50K ohms
VR2	EVML3GA00B53	Variable Resistor 5K ohms
VR3	EVML3GA00B23	Variable Resistor 2K ohms
VR4	EVML3GA00B53	Variable Resistor 5K ohms
VR10	EVML3GA00B14	Variable Resistor 10K ohms
VR11	EVML3GA00B52	Variable Resistor 500 ohms
VR12	EVML1GA00B52	Variable Resistor 500 ohms
VR13	EVML1GA00B22	Variable Resistor 200 ohms
VR14,15	EVML1GA00B23	Variable Resistor 2K ohms
VR16,17	EVML1GA00B53	Variable Resistor 5K ohms
VR18-21	EVML1GA00B23	Variable Resistor 2K ohms
VR22	EVML1GA00B53	Variable Resistor 5K ohms
VR23	EVML3GA00B53	Variable Resistor 5K ohms
VR24	EVML1GA00B23	Variable Resistor 2K ohms
VR25	EVML3GA00B53	Variable Resistor 5K ohms
VR26	EVML3GA00B52	Variable Resistor 500 ohms
VR27	EVML1GA00B13	Variable Resistor 1K ohms
VR28	EVML1GA00B52	Variable Resistor 500 ohms

REF.NO.	PART NO.	DESCRIPTION
VR29	EVML3GA00B13	Variable Resistor 1K ohms
VR30	YWPK4B104H0A	Variable Resistor 100K ohms
C1	ECEA0JS470	Electrolytic 47 µF 6.3V
C2	ECEA0JKS330	Electrolytic 33 µF 6.3V
C3	YF426104XKS	Ceramic 0.1 µF
C4	YW5CH101J5VB	Ceramic 100 pF
C5	ECEA1AKS470	Electrolytic 47 µF 10V
C6	YF426104XKS	Ceramic 0.1 µF
C7,8	YW5X103K2VB	Ceramic 0.01 µF
C9	ECEA1AKS330	Electrolytic 33µF 10V
C10	ECEA1ES4R7	Electrolytic 4.7 µF 25V
C11	ECEA0JS470	Electrolytic 47 µF 6.3V
C12	YW5CH221J5VB	Ceramic 220 pF
C14	YW5CH181J5VB	Ceramic 180 pF
C15,16	YW5F104Z2VB	Ceramic 0.1 µF
C17	ECSF1AE106	Tantalum 10 µF 10V
C18,19	ECEA0JS470	Electrolytic 47 µF 6.3V
C20	ECEA1AKS330	Electrolytic 33 µF 10V
C21	ECEA1AKS470	Electrolytic 47 µF 10V
C22,23	ECQB1H103JZ	Plastic 0.01 µF 50V
C24	ECEA0JS470	Electrolytic 47 µF 6.3V
C25	YW400102CHJT	Ceramic 1000 pF
C26	YW5CH221J5VB	Ceramic 220 pF
C27,28	YW5CH100J5VB	Ceramic 10 pF
C29	ECSF1AE225	Tantalum 2.2 µF 10V
C30	YW400102CHJT	Ceramic 1000 pF
C31	YW5CH100J5VB	Ceramic 10 pF
C32	YW5CH221J5VB	Ceramic 220 pF
C33	YW400102CHJT	Ceramic 1000 pF
C34	YW5CH100J5VB	Ceramic 10 pF
C35	YW5F104Z2VB	Ceramic 0.1 µF
C36	ECSF1CE475	Tantalum 4.7 µF 16V
C37-39	ECSF1AE475	Tantalum 4.7 µF 10V
C40,41	ECSF1AE476	Tantalum 47 µF 10V
C42,43	YW5CH100J5VB	Ceramic 10 pF
C44	ECSF1AE475	Tantalum 4.7 µF 10V
C45	YW400102CHJT	Ceramic 1000 pF
C46	YW5CH221J5VB	Ceramic 220 pF
C47	YW5CH101J5VB	Ceramic 100 pF
C48	ECEA1HKSR47	Electrolytic 0.47 µF 50V (KS)
C49	YW5CH100J5VB	Ceramic 10 pF
C50	YW5CH200J5VB	Ceramic 20 pF
C51	ECSF1AE475	Tatalum 4.7 µF 10V
C52	YW5CH220J5VB	Ceramic 22 pF
C53	ECSF1AE475	Tatalum 4.7 µF 10V
C56	ECEA0JS470	Electrolytic 47 µF 6.3V
C57	YW5F104Z2VB	Ceramic 0.1 µF
C58	ECSF1AE475	Tatalum 4.7 µF 10V
C59-61	YW5CH100J5VB	Ceramic 10 pF
C62,63	ECSF1AE475	Tatalum 4.7 µF 10V
C65	ECSF1AE475	Tatalum 4.7 µF 10V
C66	ECQV05224JC	Plastic 0.22 µF 50V
C67,68	ECSF1AE475	Tatalum 4.7 µF 10V
C69	YW400102CHJT	Ceramic 1000 pF

REF.NO.	PART NO.	DESCRIPTION	
C70,71	ECSF1AE475	Tatalum	4.7 µF 10V
C72	YF426102CHJS	Ceramic	1000 pF 50V
C73	YW5F333Z2VB	Ceramic	0.033 µF
C74	ECSF1AE475	Tatalum	4.7 µF 10V
C75	YW5F104Z2VB	Ceramic	0.1 µF
C76	ECST0JB106ZR	Tatalum	10 µF 6.3V
C77,78	YW5CH470J5VB	Ceramic	47 pF
C100-102	ECEA0JS470	Electrolytic	47 µF 6.3V
C103	YW5CH221J5VB	Ceramic	220 pF
C104	YW5CH101J5VB	Ceramic	100 pF
C105	YF400681CHJT	Ceramic	680 µF 50V
C106	YW5CH330J5VB	Ceramic	33 pF
C107	ECEA1AKS470	Electrolytic	47 µF 10V
C109	ECEA0JKS101	Electrolytic	100 µF 6.3V
C110	YW5CH470J5VB	Ceramic	47 pF
C111	ECEA1AKS470	Electrolytic	47 µF 10V
C113	ECSF0JE106	Tatalum	10 µF 6.3V
C114	YF400224FZT	Ceramic	0.22 µF
C115	YW5X103K2VB	Ceramic	0.01 µF
C116	YF400224FZT	Ceramic	0.22 µF
C117	YW5X103K2VB	Ceramic	0.01 µF
C118	YW5CH151J5VB	Ceramic	150 pF
C119	YF400224FZT	Ceramic	0.22 µF
C120	YW5F104Z2VB	Ceramic	0.1 µF
C121	ECSF0JE106	Tatalum	10 µF 6.3V
C122	YF400224FZT	Ceramic	0.22 µF
C123-125	ECSF1AE336	Tatalum	33 µF 10V
C126	YW5F104Z2VB	Ceramic	0.1 µF
C127	ECEA1AKS470	Electrolytic	47 µF 10V
C128	ECEA1AKN100	Electrolytic	10µF 10V
C129	ECEA0JS470	Electrolytic	47 µF 6.3V
C130,131	ECEA0JK220	Electrolytic	22 µF 6.3V
C132	ECEA0GU102	Electrolytic	1000 µF 4V
C133	ECEA1ES4R7	Electrolytic	4.7 µF 25V
C134	YW5F104Z2VB	Ceramic	0.1 µF
C135	YW5CH050D5VB	Ceramic	5 pF
C136	YW5CH221J5VB	Ceramic	220 pF
C138	YW5CH200J5VB	Ceramic	20 pF
C139	ECEA1AKS470	Electrolytic	47 µF 10V
C140	ECSF0JE336	Tatalum	33 µF 6.3V
C141	YW5CH331J5VB	Ceramic	330 pF
C142	YW5CH271J5VB	Ceramic	270 pF
C143	ECEA0GKS101	Electrolytic	100 µF 4V
C145	ECEA1AKS470	Electrolytic	47 µF 10V
C146	YW5CH331J5VB	Ceramic	330 pF
C147	ECSF0JE336	Tatalum	33 µF 6.3V
C148	YW5CH271J5VB	Ceramic	270 pF
C149	ECSF1CE476	Tatalum	47 µF 16V
C150	ECSF1AE336	Tatalum	33 µF 10V
C151	ECEA0JS470	Electrolytic	47 µF 6.3V
C152	ECSF1AE476	Tatalum	47 µF 10V
C153	ECEA0JKS330	Electrolytic	33 µF 6.3V
C154	ECSF1AE336	Tatalum	33 µF 10V
C155	ECEA0JS470	Electrolytic	47 µF 6.3V
C156	ECEA1HK010	Electrolytic	1 µF 50V
C157	YW5F104Z2VB	Ceramic	0.1 µF
C158	ECEA1AKK100	Electrolytic	10 µF 6.3V
C159	ECEA1CKS100	Electrolytic	10 F 10V
C160	ECEA0JS470	Electrolytic	47 µF 6.3V
C161	ECEA1AKK100	Electrolytic	10 µF 6.3V
C162	ECEA0JS470	Electrolytic	47 µF 6.3V
C163	ECEA1AKN100	Electrolytic	10 µF 10V
C164	ECEA1AKK100	Electrolytic	10 µF 6.3V
C165	ECEA0JS470	Electrolytic	47 Fµ 6.3V
C166	ECEA0JKS101	Electrolytic	100 µF 6.3V
C167	YW5CH200J5VB	Ceramic	20 pF
C168,169	ECSF0JE476	Tatalum	47 µF 6.3V
C170	ECSF0JE106	Tatalum	10 µF 6.3V
C172	ECEA1AKK100	Electrolytic	10 µF 6.3V
C173	YW5F104Z2VB	Ceramic	0.1 µF
C175	ECEA0JKA221	Electrolytic	220 µF 6.3V
C176	YW5CH151J5VB	Ceramic	150 pF
C178	YW5CH330J5VB	Ceramic	33 pF
C179	YW5CH090J5VB	Ceramic	9 pF
C180,181	YW5CH331J5VB	Ceramic	330 pF
C182	YW5CH100J5VB	Ceramic	10 pF
C183,184	ECEA1CKS100	Electrolytic	10 µF 10V
CT1-3	YWCDX20APS	Trimmer Capacitor	20 pF
CT10	YWCDY40AS	Trimmer Capacitor	40 pF
L1	EL05SI100K	Coil	10 µH
L2	EIS7EN029B	Coil	
L3,4	EL05SI100K	Coil	10 µH
L5	EIC5EB005A	Coil	
L6	EL05SI100K	Coil	10 µH
L10,11	EL05SI470K	Coil	47 µH
L12	EL05SI101K	Coil	100 µH
L15	EL05SI470K	Coil	47 µH
L16	EL05SI220K	Coil	22 µH
DL13	YWELB4M086	Delay Line	
DL14	YWELB4L130	Delay Line	
SW1,2	YWSSSS212A	Slide Switch	
SW3,4	YWCS413NTB	Rotary Switch	
X1	YWSC1406VC02	Crystal Oscillator	
X2	YWSC1773VC02	Crystal Oscillator	
X3	YWSC1773INT3	Crystal Oscillator	
CF1	YWELB4H046D	Filter	
CN1	FCN215Q050G0	50-pin Connector	
J5-8	ERDS2TC0	Jumper Resistor	
J59	ERJ3GEY0R00	Jumper Resistor	
J69	YF21160R00T	Jumper Resistor	
J72,74	ERJ3GEY0R00	Jumper Resistor	
J89,110	ERJ3GEY0R00	Jumper Resistor	
J251,266	ERJ3GEY0R00	Jumper Resistor	
J271,389	ERJ3GEY0R00	Jumper Resistor	
J390,393	ERJ3GEY0R00	Jumper Resistor	
J412,422	ERJ3GEY0R00	Jumper Resistor	
TP1-14	YW32BM5A	Test-pin	
TP100-111	YW32BM5A	Test-pin	
M82	YWV2HA0935A4	Shield Parts	

PREAMPLIFER BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB3 (NLA)	YWVKBF350E1A	Printed Circuit Board Assy
IC1	MN74HC4053S	IC
IC2	YWUPC4064G2	IC
Q1	2SB1219-QRS	Transistor
Q2	2SB793A-RS	Transistor
Q3	2SD1819-QRS	Transistor
Q4	2SB793A-RS	Transistor
Q5	2SD1819-QRS	Transistor
Q6	2SD973A-RS	Transistor
Q7,8	2SB1218-QRS	Transistor
Q101	2SA1532-CD	Transistor
Q102	3SK157	FET
Q103	2SC3931-CD	Transistor
Q104	2SA1532-CD	Transistor
Q105	3SK157	FET
Q106	2SC3931-CD	Transistor
Q107	XN6534	Transistor
Q108	XN6501	Transistor
Q109	2SB1218-QRS	Transistor
Q110	XN4601	Transistor
Q112	2SC3931-CD	Transistor
Q113	2SA1532-CD	Transistor
Q114	3SK157	FET
Q115	2SC3931-CD	Transistor
Q116	XN6534	Transistor
Q117	2SD1819-QRS	Transistor
Q201	2SA1532-CD	Transistor
Q202	3SK157	FET
Q203	2SC3931-CD	Transistor
Q204	2SA1532-CD	Transistor
Q205	3SK157	FET
Q206	2SC3931-CD	Transistor
Q207	XN6534	Transistor
Q208	XN6501	Transistor
Q209	2SB1218-QRS	Transistor
Q210	XN4601	Transistor
Q212	2SC3931-CD	Transistor
Q213	2SA1532-CD	Transistor
Q214	3SK157	FET
Q215	2SC3931-CD	Transistor
Q216	XN6534	Transistor
Q217	2SD1819-QRS	Transistor
Q301	2SA1532-CD	Transistor
Q302	3SK157	FET
Q303	2SC3931-CD	Transistor
Q304	2SA1532-CD	Transistor
Q305	3SK157	FET
Q306	2SC3931-CD	Transistor
Q307	XN6534	Transistor
Q308	XN6501	Transistor
Q309	2SB1218-QRS	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q310	XN4601	Transistor	
Q312	2SC3931-CD	Transistor	
Q313	2SA1532-CD	Transistor	
Q314	3SK157	FET	
Q315	2SC3931-CD	Transistor	
Q316	XN6534	Transistor	
Q317	2SD1819-QRS	Transistor	
R2	YF2116101JT	Carbon	100 ohms 1/16W
R3	YW2116182JT	Carbon	1.8K ohms 1/16W
R4	YF2116302GT	Carbon	3K ohms 1/16W
R5,6	YF2116101JT	Carbon	100 ohms 1/16W
R7-9	YF2116102GT	Carbon	1K ohms 1/16W
R10	YWR1220P473D	Metal	47K ohms
R11	YWR1220P153D	Metal	15K ohms
R12	YWR1220P393D	Metal	39K ohms
R13	R1220P133D	Metal	13K ohms
R14	YF2116102GT	Carbon	1K ohms 1/16W
R15	YF2116331JT	Carbon	330 ohms 1/16W
R16	YWR1220P473D	Metal	47K ohms
R17	YWR1220P153D	Metal	15K ohms
R18	YWR1220P393D	Metal	39K ohms
R19	R1220P133D	Metal	13K ohms
R20	YF2116102GT	Carbon	1K ohms 1/16W
R21	YF2116331JT	Carbon	330 ohms 1/16W
R22	YWR1220P473D	Metal	47K ohms
R23	YWR1220P153D	Metal	15K ohms
R24	YWR1220P393D	Metal	39K ohms
R25	R1220P133D	Metal	13K ohms
R26	YF2116102GT	Carbon	1K ohms 1/16W
R27	YF2116331JT	Carbon	330 ohms 1/16W
R28	R1220P133D	Metal	13K ohms
R29	R1220P822D	Metal	8.2K ohms
R30	YF2116152JT	Carbon	1.5K ohms 1/16W
R102	YF2116223JT	Carbon	22K ohms 1/16W
R103	YF2116472GT	Carbon	4.7K ohms 1/16W
R104	YF2116153JT	Carbon	15K ohms 1/16W
R105	YF2116683GT	Carbon	68K ohms 1/16W
R107	YF2116153JT	Carbon	15K ohms 1/16W
R108	YW2116182JT	Carbon	1.8K ohms 1/16W
R109	YF2116330JT	Carbon	33 ohms 1/16W
R110	YF2116153JT	Carbon	15K ohms 1/16W
R111	YWR1220P102D	Metal	1K ohms
R112	YF2116394JT	Carbon	390K ohms 1/16W
R113	YWR1220P471D	Metal	470 ohms
R114	R1220P121D	Metal	120 ohms
R115	R1220P151D	Metal	150 ohms
R116	YF2116102GT	Carbon	1K ohms 1/16W
R117	YWR1220P153D	Metal	15K ohms
R118	YWR1220P112D	Metal	1.1K ohms
R119	YF2116682JT	Carbon	6.8K ohms 1/16W
R120	YF2116222GT	Carbon	2.2K ohms 1/16W
R124	YF2116153JT	Carbon	15K ohms 1/16W
R125	YW2116182JT	Carbon	1.8K ohms 1/16W
R126	YF2116823JT	Carbon	82K ohms 1/16W
R127	YF2116473GT	Carbon	47K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R128	YF2116330JT	Carbon	33 ohms 1/16W
R129	YF2116153JT	Carbon	15K ohms 1/16W
R130	YF2116221JT	Carbon	220 ohms 1/16W
R131,133	YF2116102GT	Carbon	1K ohms 1/16W
R134	YF2116122JT	Carbon	1.2K ohms 1/16W
R135	YF2116472GT	Carbon	4.7K ohms 1/16W
R136	YF2116102GT	Carbon	1K ohms 1/16W
R137	YF2116224JT	Carbon	220K ohms 1/16W
R138	YF2116682JT	Carbon	6.8K ohms 1/16W
R139	YF2116101JT	Carbon	100 ohms 1/16W
R140	YF2116152JT	Carbon	1.5K ohms 1/16W
R141	YF2116101JT	Carbon	100 ohms 1/16W
R142	YF2116241JT	Carbon	240 ohms 1/16W
R143	YF2116101JT	Carbon	100 ohms 1/16W
R144	YW2116242JT	Carbon	2.4K ohms 1/16W
R202	YF2116223JT	Carbon	22K ohms 1/16W
R203	YF2116472GT	Carbon	4.7K ohms 1/16W
R204	YF2116153JT	Carbon	15K ohms 1/16W
R205	YF2116683GT	Carbon	68K ohms 1/16W
R207	YF2116153JT	Carbon	15K ohms 1/16W
R208	YW2116182JT	Carbon	1.8K ohms 1/16W
R209	YF2116330JT	Carbon	33 ohms 1/16W
R210	YF2116153JT	Carbon	15K ohms 1/16W
R211	YWR1220P102D	Metal	1K ohms
R212	YF2116394JT	Carbon	390K ohms 1/16W
R213	YWR1220P471D	Metal	470 ohms
R214	R1220P121D	Metal	120 ohms
R215	R1220P151D	Metal	150 ohms
R216	YF2116102GT	Carbon	1K ohms 1/16W
R217	YWR1220P153D	Metal	15K ohms
R218	YWR1220P112D	Metal	1.1K ohms
R219	YF2116682JT	Carbon	6.8K ohms 1/16W
R220	YF2116222GT	Carbon	2.2K ohms 1/16W
R224	YF2116153JT	Carbon	15K ohms 1/16W
R225	YW2116182JT	Carbon	1.8K ohms 1/16W
R226	YF2116823JT	Carbon	82K ohms 1/16W
R227	YF2116473GT	Carbon	47K ohms 1/16W
R228	YF2116330JT	Carbon	33 ohms 1/16W
R229	YF2116153JT	Carbon	15K ohms 1/16W
R230	YF2116221JT	Carbon	220 ohms 1/16W
R231	YF2116102GT	Carbon	1K ohms 1/16W
R232	YF2116823JT	Carbon	82K ohms 1/16W
R233	YF2116102GT	Carbon	1K ohms 1/16W
R234	YF2116122JT	Carbon	1.2K ohms 1/16W
R235	YF2116472GT	Carbon	4.7K ohms 1/16W
R236	YF2116102GT	Carbon	1K ohms 1/16W
R237	YF2116224JT	Carbon	220K ohms 1/16W
R238	YF2116682JT	Carbon	6.8K ohms 1/16W
R239	YF2116101JT	Carbon	100 ohms 1/16W
R240	YF2116152JT	Carbon	1.5K ohms 1/16W
R241	YF2116101JT	Carbon	100 ohms 1/16W
R242	YF2116241JT	Carbon	240 ohms 1/16W
R243	YF2116101JT	Carbon	100 ohms 1/16W
R244	YW2116242JT	Carbon	2.4K ohms 1/16W
R302	YF2116223JT	Carbon	22K ohms 1/16W
R303	YF2116472GT	Carbon	4.7K ohms 1/16W
R304	YF2116153JT	Carbon	15K ohms 1/16W
R305	YF2116683GT	Carbon	68K ohms 1/16W
R307	YF2116153JT	Carbon	15K ohms 1/16W
R308	YW2116182JT	Carbon	1.8K ohms 1/16W
R309	YF2116330JT	Carbon	33 ohms 1/16W
R310	YF2116153JT	Carbon	15K ohms 1/16W
R311	YWR1220P102D	Metal	1K ohms
R312	YF2116394JT	Carbon	390K ohms 1/16W
R313	YWR1220P471D	Metal	470 ohms
R314	R1220P121D	Metal	120 ohms
R315	R1220P151D	Metal	150 ohms
R316	YF2116102GT	Carbon	1K ohms 1/16W
R317	YWR1220P153D	Metal	15K ohms
R318	YWR1220P112D	Metal	1.1K ohms
R319	YF2116682JT	Carbon	6.8K ohms 1/16W
R320	YF2116222GT	Carbon	2.2K ohms 1/16W
R324	YF2116153JT	Carbon	15K ohms 1/16W
R325	YW2116182JT	Carbon	1.8K ohms 1/16W
R326	YF2116823JT	Carbon	82K ohms 1/16W
R327	YF2116473GT	Carbon	47K ohms 1/16W
R328	YF2116330JT	Carbon	33 ohms 1/16W
R329	YF2116153JT	Carbon	15K ohms 1/16W
R330	YF2116221JT	Carbon	220 ohms 1/16W
R331,333	YF2116102GT	Carbon	1K ohms 1/16W
R334	YF2116122JT	Carbon	1.2K ohms 1/16W
R335	YF2116472GT	Carbon	4.7K ohms 1/16W
R336	YF2116102GT	Carbon	1K ohms 1/16W
R337	YF2116224JT	Carbon	220K ohms 1/16W
R338	YF2116682JT	Carbon	6.8K ohms 1/16W
R339	YF2116101JT	Carbon	100 ohms 1/16W
R340	YF2116152JT	Carbon	1.5K ohms 1/16W
R341	YF2116101JT	Carbon	100 ohms 1/16W
R342	YF2116241JT	Carbon	240 ohms 1/16W
R343	YF2116101JT	Carbon	100 ohms 1/16W
R344	YW2116242JT	Carbon	2.4K ohms 1/16W
VR101,201	EVML3GA00B12	Variable Resistor	100 ohms
VR301	EVML3GA00B12	Variable Resistor	100 ohms
C1	ECEA0GKS101	Electrolytic	100 µF 4V
C2	ECSF1AE106		10 µF 10V
C3	ECEA0GKK220	Electrolytic	22 µF 4V
C4	ECEA1AKA101	Electrolytic	100 µF 10V
C5	ECEA0GKK220	Electrolytic	22 µF 4V
C6	ECEA0JKS101	Electrolytic	100 µF 6.3V
C7	ECEA0GKK220	Electrolytic	22 µF 4V
C8	ECEA0JKS101	Electrolytic	100 µF 6.3V
C9	ECEA0JSN220	Electrolytic	22 µF 6.3V
C101	ECSF1CE226		22 µF 16V
C102-104	YF400104FZT	Ceramic	0.1 µF
C105	YF400390CHJT	Ceramic	39 pF
C106	ECEA0JSN220	Electrolytic	22 µF 6.3V
C107	YF400220CHJT	Ceramic	22 pF
C108	YF400104FZT	Ceramic	0.1 µF
C109	YF400101CHJT	Ceramic	100 pF
C110	ECEA0GKK220	Electrolytic	22 µF 4V

REF.NO.	PART NO.	DESCRIPTION	
C112,113	ECEA0JKS101	Electrolytic	100 µF 6.3V
C115	YF400220CHJT	Ceramic	22 pF
C116	YF400104FZT	Ceramic	0.1 µF
C117	ECSF1CE106	Electrolytic	10 µF 16V
C118	ECSF1AE106	Electrolytic	10 µF 10V
C120	YF400220CHJT	Ceramic	22 pF
C121	ECEA1AKA101	Electrolytic	100 µF 10V
C122	ECEA0JKS101	Electrolytic	100 µF 6.3V
C123	ECSF1AE106	Electrolytic	10 µF 10V
C124	YF400220CHJT	Ceramic	22 pF
C125	YF400360CHJT	Ceramic	36 pF
C126	YF400220CHJT	Ceramic	22 pF
C127	YF400180CHJT	Ceramic	18 pF
C201	ECSF1CE226	Tantalum	22 µF 16V
C202-204	YF400104FZT	Ceramic	0.1 µF
C205	YF400390CHJT	Ceramic	39 pF
C206	ECEA0JSN220	Electrolytic	22 µF 6.3V
C207	YF400220CHJT	Ceramic	22 pF
C208	YF400104FZT	Ceramic	0.1 µF
C209	YF400101CHJT	Ceramic	100 pF
C210	ECEA0GKK220	Electrolytic	22 µF 4V
C212,213	ECEA0JKS101	Electrolytic	100 µF 6.3V
C215	YF400220CHJT	Ceramic	22 pF
C216	YF400104FZT	Ceramic	0.1 µF
C217	ECSF1CE106	Electrolytic	10 µF 16V
C218	ECSF1AE106	Electrolytic	10 µF 10V
C220	YF400220CHJT	Ceramic	22 pF
C221	ECEA1AKA101	Electrolytic	100 µF 10V
C222	ECEA0JKS101	Electrolytic	100 µF 6.3V
C223	ECSF1AE106	Tantalum	10 µF 10V
C224	YF400220CHJT	Ceramic	22 pF
C225	YF400360CHJT	Ceramic	36 pF
C226	YF400220CHJT	Ceramic	22 pF
C227	YF400180CHJT	Ceramic	18 pF
C301	ECSF1CE226	Tantalum	22 µF 16V
C302-304	YF400104FZT	Ceramic	0.1 µF
C305	YF400390CHJT	Ceramic	39 pF
C306	ECEA0JSN220	Electrolytic	22 µF 6.3V
C307	YF400220CHJT	Ceramic	22 pF
C308	YF400104FZT	Ceramic	0.1 µF
C309	YF400101CHJT	Ceramic	100 pF
C310	ECEA0GKK220	Electrolytic	22 µF 4V
C312,313	ECEA0JKS101	Electrolytic	100 µF 6.3V
C315	YF400220CHJT	Ceramic	22 pF
C316	YF400104FZT	Ceramic	0.1 µF
C317	ECSF1CE106	Tantalum	10 µF 16V
C318	ECSF1AE106	Tantalum	10 µF 10V
C320	YF400220CHJT	Ceramic	22 pF
C321	ECEA1AKA101	Electrolytic	100 µF 10V
C322	ECEA0JKS101	Electrolytic	100 µF 6.3V

REF.NO.	PART NO.	DESCRIPTION	
C323	ECSF1AE106	Tantalum	10 µF 10V
C324	YF400220CHJT	Ceramic	22 pF
C325	YF400360CHJT	Ceramic	36 pF
C326	YF400220CHJT	Ceramic	22 pF
C327	YF400180CHJT	Ceramic	18 pF
L1	ELJFA100KF	Coil	10 µH
L2	ELJFA4R7MF	Coil	4.7 µH
L3,4	ELJFA100KF	Coil	10 µH
L5	ELJFA8R2MF	Coil	8.2 µH
L6	ELJFA100KF	Coil	10 µH
L7	ELJFA8R2MF	Coil	8.2 µH
L8	ELJFA100KF	Coil	10 µH
L9	ELJFA8R2MF	Coil	8.2 µH
L10	ELJFA100KF	Coil	10 µH
L11-13	ELJFA2R2KF	Coil	2.2 µH
L14-16	ELJFA4R7MF	Coil	4.7 µH
CF101,201	YWF05W2345	Filter	
CF301	YWF05W2345	Filter	
CN1	10PED4T1PN1	10-pin Connector	
CN2	YWE021200002	2-pin Connector	
CN3	YWE021200000	Connector	
CN4	YWE021200001	Connector	
J106,206	YF21160R00T	Jumper Resistor	
J306	YF21160R00T	Jumper Resistor	
E1-12	YW32BM5A	Terminal	
M75	YWV2HA0839A3	Shield Parts	
M76	YWV6GA0157A4	Plate	

REF.NO.	PART NO.	DESCRIPTION	
PROCESS BOARD			
PCB4 (NLA)	YWVKCF350E1A	Printed Circuit Board Assy	
HIC1	YWHB71	IC	
HIC2	YWHB77	IC	
HIC3	YWHB71	IC	
HIC4	YWHB77	IC	
HIC5	YWHB71	IC	
HIC6	YWHB77	IC	
IC1	NJM2902M	IC	
IC2	MN4053BS	IC	
IC3	NJM2902M	IC	
IC4	HD14572UBFP	IC	
IC5	MN4050BS	IC	
IC6	MN4049BS	IC	
Q1-3	2SD601-RS	Transistor	
Q4	2SB793-RS	Transistor	
Q5	2SD973-QRS	Transistor	
Q6-8	2SB709-RS	Transistor	
Q9-24	2SD601-RS	Transistor	
Q25,26	2SB709-RS	Transistor	
Q27,28	2SD601-RS	Transistor	
Q29,30	2SB709-RS	Transistor	
Q31,32	2SD601-RS	Transistor	
Q33,34	2SB709-RS	Transistor	
Q35-40	2SD601-RS	Transistor	
Q41-43	2SB709-RS	Transistor	
Q44	2SD601-RS	Transistor	
D1	MA151WA	Diode	
D2,4	MA151K	Diode	
D5,6	MA151K	Diode	
R1	YW2116182JT	Carbon	1.8K ohms 1/16W
R2	YF2116333GT	Carbon	33K ohms 1/16W
R3	YWR1220P472D	Metal	4.7K ohms
R4	YF2116271JT	Carbon	270 ohms 1/16W
R5	YW2116182JT	Carbon	1.8K ohms 1/16W
R6	YF2116333GT	Carbon	33K ohms 1/16W
R7	YWR1220P472D	Metal	4.7K ohms
R8	YF2116271JT	Carbon	270 ohms 1/16W
R9	YF2116100JT	Carbon	10 ohms 1/16W
R10	YF2116221JT	Carbon	220 ohms 1/16W
R11	YF2116333GT	Carbon	33K ohms 1/16W
R12	YWR1220P302D	Metal	3K ohms
R13	YF2116271JT	Carbon	270 ohms 1/16W
R14-16	YF2116472GT	Carbon	4.7K ohms 1/16W
R17	YF2116104JT	Carbon	100K ohms 1/16W
R18	YF2116683GT	Carbon	68K ohms 1/16W
R19	YF2116103JT	Carbon	10K ohms 1/16W
R21	YF2116334JT	Carbon	330K 1/16W
R22	YF2116224JT	Carbon	220K ohms 1/16W
R23	YF2116334JT	Carbon	330K 1/16W
R24	YF2116224JT	Carbon	220K ohms 1/16W
R25	YF2116334JT	Carbon	330K 1/16W
R26	YF2116224JT	Carbon	220K ohms 1/16W
R27,28	YF2116333GT	Carbon	33K ohms 1/16W
R29	YF2116472GT	Carbon	4.7K ohms 1/16W
R32,35	YF2116104JT	Carbon	100K ohms 1/16W
R38	YF2116104JT	Carbon	100K ohms 1/16W
R39	YF2116472GT	Carbon	4.7K ohms 1/16W
R40	YF2116332JT	Carbon	3.3K ohms 1/16W
R41	YF2116331JT	Carbon	330 ohms 1/16W
R42	YF2116472GT	Carbon	4.7K ohms 1/16W
R43,44	YF2116102GT	Carbon	1K ohms 1/16W
R45-47	YF2116331JT	Carbon	330 ohms 1/16W
R48,49	YF2116472GT	Carbon	4.7K ohms 1/16W
R50,51	YF2116102GT	Carbon	1K ohms 1/16W
R52-54	YF2116331JT	Carbon	330 ohms 1/16W
R55,56	YF2116472GT	Carbon	4.7K ohms 1/16W
R57,58	YF2116102GT	Carbon	1K ohms 1/16W
R59-61	YF2116331JT	Carbon	330 ohms 1/16W
R62,63	YF2116472GT	Carbon	4.7K ohms 1/16W
R64,65	YWR1220P103D	Metal	10K ohms
R66	YFR1220P113D	Metal	11K ohms
R67	R1220P123D	Metal	12K ohms
R68,69	YF2116102GT	Carbon	1K ohms 1/16W
R70,71	YWR1220P103D	Metal	10K ohms
R72	R1220P123D	Metal	12K ohms
R73	YWR1220P103D	Metal	10K ohms
R74,75	YF2116102GT	Carbon	1K ohms 1/16W
R76	YWR1220P683D	Metal	68K ohms
R77	YWR1220P273D	Metal	27K ohms
R78	YF2116101JT	Carbon	100 ohms 1/16W
R79	YWR1220P102D	Metal	1K ohms
R80	YF2116103JT	Carbon	10K ohms 1/16W
R81	YWR1220P102D	Metal	1K ohms
R82	YF2116103JT	Carbon	10K ohms 1/16W
R83	YWR1220P102D	Metal	1K ohms
R84	YF2116103JT	Carbon	10K ohms 1/16W
R85	YF2116223JT	Carbon	22K ohms 1/16W
R86	YF2116104JT	Carbon	100K ohms 1/16W
R87	YF2116223JT	Carbon	22K ohms 1/16W
R88	YF2116104JT	Carbon	100K ohms 1/16W
R89	YF2116103JT	Carbon	10K ohms 1/16W
R90	YF2116104JT	Carbon	100K ohms 1/16W
R91	YF2116683GT	Carbon	68K ohms 1/16W
R92	YF2116472GT	Carbon	4.7K ohms 1/16W
R93	YF2116103JT	Carbon	10K ohms 1/16W
R94	YF2116562JT	Carbon	5.6K ohms 1/16W
R95	YF2116272JT	Carbon	2.7K ohms 1/16W
R96,97	YF2116104JT	Carbon	100K ohms 1/16W
R98	YF2116562JT	Carbon	5.6K ohms 1/16W
R99	YF2116101JT	Carbon	100 ohms 1/16W
R100,101	YF2116103JT	Carbon	10K ohms 1/16W
R102	YF2116622JT	Carbon	6.2K ohms 1/16W
R103	YF2116103JT	Carbon	10K ohms 1/16W
R104	YF2116102GT	Carbon	1K ohms 1/16W
R105	YF2116333GT	Carbon	33K ohms 1/16W
R106	YF2116103JT	Carbon	10K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R107	YF2116333GT	Carbon	33K ohms 1/16W
R108,109	YF2116104JT	Carbon	100K ohms 1/16W
R110	YF2116562JT	Carbon	5.6K ohms 1/16W
R111	YF2116101JT	Carbon	100 ohms 1/16W
R112,113	YF2116103JT	Carbon	10K ohms 1/16W
R114	YF2116622JT	Carbon	6.2K ohms 1/16W
R115	YF2116103JT	Carbon	10K ohms 1/16W
R116	YF2116102GT	Carbon	1K ohms 1/16W
R117	YF2116333GT	Carbon	33K ohms 1/16W
R118	YF2116103JT	Carbon	10K ohms 1/16W
R119	YF2116333GT	Carbon	33K ohms 1/16W
R120,121	YF2116104JT	Carbon	100K ohms 1/16W
R122	YF2116562JT	Carbon	5.6K ohms 1/16W
R123	YF2116101JT	Carbon	100 ohms 1/16W
R124,125	YF2116103JT	Carbon	10K ohms 1/16W
R126	YF2116622JT	Carbon	6.2K ohms 1/16W
R127	YF2116103JT	Carbon	10K ohms 1/16W
R128	YF2116102GT	Carbon	1K ohms 1/16W
R129	YF2116333GT	Carbon	33K ohms 1/16W
R130	YF2116103JT	Carbon	10K ohms 1/16W
R131	YF2116333GT	Carbon	33K ohms 1/16W
R132	YF2116512JT	Carbon	5.1K ohms 1/16W
R133	YF2116472GT	Carbon	4.7K ohms 1/16W
R134,136	YF2116103JT	Carbon	10K ohms 1/16W
R138,140	YF2116103JT	Carbon	10K ohms 1/16W
R142-150	YF2116101JT	Carbon	100 ohms 1/16W
R151	YF2116103JT	Carbon	10K ohms 1/16W
R152,153	YF2116123JT	Carbon	12K ohms 1/16W
R154,156	YF2116102GT	Carbon	1K ohms 1/16W
R158	YF2116102GT	Carbon	1K ohms 1/16W
R160-162	YF2116103JT	Carbon	10K ohms 1/16W
R163-165	YF2116102GT	Carbon	1K ohms 1/16W
R166-168	YF2116103JT	Carbon	10K ohms 1/16W
R169	YWR1220P562D	Metal	5.6K ohms
R170	YFR1220P113D	Metal	11K ohms
R171	YF2116512JT	Carbon	5.1K ohms 1/16W
R172-174	YF2116103JT	Carbon	10K ohms 1/16W
R175	YWR1220P223D	Metal	22K ohms
R176	R1220P822D	Metal	8.2K ohms
R177	ERSB47G102	Metal	1K ohms
R180	YF2116512JT	Carbon	5.1K ohms 1/16W
VR1	EVML1GA00B23	Variable Resistor	2K ohms
VR2	EVML3GA00B14	Variable Resistor	10K ohms
VR3	EVML3GA00B15	Variable Resistor	100K ohms
VR4	EVML1GA00B13	Variable Resistor	1K ohms
VR5-7	EVML3GA00B13	Variable Resistor	1K ohms
VR8	EVML1GA00B23	Variable Resistor	2K ohms
VR9	EVML3GA00B14	Variable Resistor	10K ohms
VR10	EVML3GA00B15	Variable Resistor	100K ohms
VR11	EVML1GA00B13	Variable Resistor	1K ohms
VR12,13	EVML3GA00B13	Variable Resistor	1K ohms
VR14	EVML1GA00B13	Variable Resistor	1K ohms
VR15	EVML3GA00B14	Variable Resistor	10K ohms
VR16	EVML3GA00B15	Variable Resistor	100K ohms
VR17	EVML1GA00B13	Variable Resistor	1K ohms

REF.NO.	PART NO.	DESCRIPTION	
VR18-20	EVML3GA00B13	Variable Resistor	1K ohms
VR21-29	EVML1GA00B15	Variable Resistor	100K ohms
VR30-32	EVML1GA00B53	Variable Resistor	5K ohms
VR33	EVML3GA00B15	Variable Resistor	100K ohms
VR34	EVML3GA00B14	Variable Resistor	10K ohms
VR35	EVML3GA00B15	Variable Resistor	100K ohms
VR36	EVML3GA00B14	Variable Resistor	10K ohms
VR37	EVML3GA00B15	Variable Resistor	100K ohms
VR38-40	EVML3GA00B14	Variable Resistor	10K ohms
VR41-43	EVML3GA00B12	Variable Resistor	100 ohms
C2	ECST0GC476	Electrolytic	47 µF 4V
C3	ECST0JC226	Electrolytic	22 µF 6.3V
C4	ECEA0JS470	Electrolytic	47 µF 6.3V
C5	ECEA1CKS100	Electrolytic	10 µF 10V
C6	ECEA0JKS470	Electrolytic	47 µF 6.3V
C7-9	YF426224FZS	Ceramic	0.22 µF 50V
C10	YF400104FZT	Ceramic	0.1 µF
C11	ECEA1ASN100	Electrolytic	10 µF 10V
C12	ECEA1HKK010	Electrolytic	1 µF 50V
C13	ECEA1ASN100	Electrolytic	10 µF 10V
C14	ECST0JD476ZR	Electrolytic	47 µF 63.V
C15	ECEA1AU221	Electrolytic	220 µF 10V
C16	ECST1AB106	Electrolytic	10 µF 10V
C17	ECEA1ASN100	Electrolytic	10 µF 10V
C21	ECST0GC476	Electrolytic	47 µF 4V
C22	ECST0JC226	Electrolytic	22 µF 6.3V
C23	ECEA0JS470	Electrolytic	47 µF 6.3V
C24	ECST1AB106	Electrolytic	10 µF 10V
C25	ECEA0JKS470	Electrolytic	47 µF 6.3V
C26-28	YF426224FZS	Ceramic	0.22 µF 50V
C29	YF400104FZT	Ceramic	0.1 µF
C30	ECEA1ASN100	Electrolytic	10 µF 10V
C31	ECEA1HKK010	Electrolytic	1 µF 50V
C32	ECEA1ASN100	Electrolytic	10 µF 10V
C33	ECST0JD476ZR	Electrolytic	47 µF 63.V
C34	ECEA1AU221	Electrolytic	220 µF 10V
C35	ECST1AB106	Electrolytic	10 Fµ 10V
C36	ECEA1ASN100	Electrolytic	10 µF 10V
C39	YF400100CHDT	Ceramic	10 pF
C40	ECST0GC476	Electrolytic	47 µF 4V
C41	ECEA0JK220	Electrolytic	22 µF 6.3V
C42	ECST0JD476ZR	Electrolytic	47 µF 63.V
C43	ECST1AB106	Electrolytic	10 µF 10V
C44	ECEA0JKS470	Electrolytic	47 µF 6.3V
C45-47	YF426224FZS	Ceramic	0.22 µF 50V
C48	YF400104FZT	Ceramic	0.1 µF
C49	ECEA1ASN100	Electrolytic	10 µF 10V
C50	ECEA1HKK010	Electrolytic	1 µF 50V
C51	ECEA1ASN100	Electrolytic	10 µF 10V
C52	ECEA0JS470	Electrolytic	47 µF 6.3V
C53	ECEA1AU221	Electrolytic	220 µF 10V
C54	ECST1AB106	Electrolytic	10 µF 10V
C55	ECEA1ASN100	Electrolytic	10 µF 10V
C58	ECEA1HKK010	Electrolytic	1 µF 50V
C59,60	YF400104FZT	Ceramic	0.1 µF

REF.NO.	PART NO.	DESCRIPTION
C61	ECEA1CKS470	Electrolytic 47 µF 16V
C62	ECEA0JKS470	Electrolytic 47 µF 6.3V
C63	YF400104FZT	Ceramic 0.1 µF
C64,65	ECST1AD336ZR	Electrolytic 33 µF 10V
C66	YF400104FZT	Ceramic 0.1 µF
C67,68	ECST1AD336ZR	Electrolytic 33 µF 10V
C69	YF400104FZT	Ceramic 0.1 µF
C70,71	ECST1AD336ZR	Electrolytic 33 µF 10V
C72	ECST1AD476ZR	Electrolytic 47 µF 10V
C73	ECST0JD476ZR	Electrolytic 47 µF 63.V
C74	YF400104FZT	Ceramic 0.1 µF
C75	ECEA1CKS470	Electrolytic 47 µF 16V
C76	YF400104FZT	Ceramic 0.1 µF
C77	ECST1AD476ZR	Electrolytic 47 µF 10V
C78	ECST0JX106	Electrolytic 10 µF 6.3V
C79	YF400104FZT	Ceramic 0.1 µF
C80	ECST0JD476ZR	Electrolytic 47 µF 63.V
C81	ECEA1CKS470	Electrolytic 47 µF 16V
C82	ECST1AB106	Electrolytic 10 µF 10V
C83-85	YF400104FZT	Ceramic 0.1 µF
C86	YF400680CHJT	Ceramic 68 pF CH
C87	YWY5V1A335ZP	Ceramic 3.3 µF
C88	YF400820CHJT	Ceramic 82 pF
C89	YF400104FZT	Ceramic 0.1 µF
C90-92	YF400100CHDT	Ceramic 10 pF
CT1-3	YWCDX20APS	Trimmer Capacitor 20 pF
DL1-3	ELB4D032	Delay Line
SW1-3	YWSSS21200	Slide Switch
CN1	FCN215Q050G0	50 pin Connector
J3,6	YF21160R00T	Jumper Resistor
J9,31	YF21160R00T	Jumper Resistor
J34,37	YF21160R00T	Jumper Resistor
J155,157	YF21160R00T	Jumper Resistor
J159	YF21160R00T	Jumper Resistor
TP1-25	YW32BM5A	Test-pin

DETAIL/SHADING BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB5 (NLA)	YWVKBF250P2A	Printed Circuit Board Assy
IC1	MN74HC21S	IC
IC2	MN74HC4040S	IC
IC3	MN74HC10S	IC
IC4	TC5081AP	IC
IC5	MN74HCU04S	IC
IC6	MN4053BS	IC
IC7	YWCXL1004P	IC
IC8	NJM2902M	IC
IC9	MN4053BS	IC
IC10	YWCXL1004P	IC
IC11	NJM592M8	IC
IC12	MN4053BS	IC
IC13	MN74HC00S	IC
IC14	MN74HC221S	IC
IC15	MN74HC74S	IC
IC16,17	YWTC4S66FR	IC
IC18	YWTC4S69F	IC
IC19	YWHB88	IC
IC20	YWTC4S66FR	IC
Q4	2SD601-RS	Transistor
Q5,6	2SC2404-CD	Transistor
Q7	2SB709-RS	Transistor
Q8	2SD601-RS	Transistor
Q9	2SC2404-CD	Transistor
Q10	2SB709-RS	Transistor
Q11	2SD601-RS	Transistor
Q12	2SB709-RS	Transistor
Q13-16	2SD601-RS	Transistor
Q17-19	2SC2404-CD	Transistor
Q20	2SA1022-C	Transistor
Q21	2SB709-RS	Transistor
Q22	2SB793-RS	Transistor
Q23	2SD601-RS	Transistor
Q24,25	2SC2404-CD	Transistor
Q26-29	2SD601-RS	Transistor
Q30-32	2SC2404-CD	Transistor
Q33	2SA1022-C	Transistor
Q34	2SB709-RS	Transistor
Q35-39	2SD601-RS	Transistor
Q42	2SD601-RS	Transistor
Q43-46	2SB709-RS	Transistor
Q47	2SK198-P	Transistor
Q48	2SD601-RS	Transistor
Q49,50	2SK198-P	Transistor
Q51,52	2SD601-RS	Transistor
Q53	2SC2404-CD	Transistor
Q54	2SD601-RS	Transistor
Q55-60	2SC2404-CD	Transistor
Q61	2SD601-RS	Transistor
Q62	2SC2404-CD	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q63	2SD601-RS	Transistor	
D1,2	MA151K	Diode	
D3,4	1SS97-2	Diode	
D5	MA151K	Diode	
D6	MA328	Diode	
D8	MA151K	Diode	
D9	MA151WK	Diode	
D10	MA151K	Diode	
R3	YF2116472GT	Carbon	4.7K ohms 1/16W
R4	YF2116473GT	Carbon	47K ohms 1/16W
R5	YF2116100JT	Carbon	10 ohms 1/16W
R6	YW2116105JT	Carbon	1M ohms 1/16W
R8	YF2116102GT	Carbon	1K ohms 1/16W
R9	YW2116105JT	Carbon	1M ohms 1/16W
R15	YF2116222GT	Carbon	2.2K ohms 1/16W
R16	YF2116103JT	Carbon	10K ohms 1/16W
R17,18	YF2116332JT	Carbon	3.3K ohms 1/16W
R19	YF2116472GT	Carbon	4.7K ohms 1/16W
R20,21	YF2116102GT	Carbon	1K ohms 1/16W
R22	YF2116332JT	Carbon	3.3K ohms 1/16W
R23	YF2116103JT	Carbon	10K ohms 1/16W
R24	YF2116272JT	Carbon	2.7K ohms 1/16W
R25	YF2116152JT	Carbon	1.5K ohms 1/16W
R26	YF2116333GT	Carbon	33K ohms 1/16W
R27	YF2116103JT	Carbon	10K ohms 1/16W
R28	YF2116472GT	Carbon	4.7K ohms 1/16W
R29,30	YW2116105JT	Carbon	1M ohms 1/16W
R31	YF2116303GT	Carbon	30K ohms 1/16W
R32	YF2116153JT	Carbon	15K ohms 1/16W
R33	YF2116272JT	Carbon	2.7K ohms 1/16W
R34,35	YF2116102GT	Carbon	1K ohms 1/16W
R36	YF2116103JT	Carbon	10K ohms 1/16W
R37	YF2116561JT	Carbon	560 ohms 1/16W
R38	YF2116271JT	Carbon	270 ohms 1/16W
R39	YF2116561JT	Carbon	560 ohms 1/16W
R40	ERSB27J512	Metal	5.1K ohms
R41	YF2116122JT	Carbon	1.2K ohms 1/16W
R42	YF2116103JT	Carbon	10K ohms 1/16W
R43	YF2116222GT	Carbon	2.2K ohms 1/16W
R44,45	YF2116103JT	Carbon	10K ohms 1/16W
R46	YF2116562JT	Carbon	5.6K ohms 1/16W
R47	YF2116152JT	Carbon	1.5K ohms 1/16W
R48	YF2116472GT	Carbon	4.7K ohms 1/16W
R49	YF2116561JT	Carbon	560 ohms 1/16W
R50,51	YWR1220P563D	Metal	56K ohms
R52	YFR1220P113D	Metal	11K ohms
R53	YF2116103JT	Carbon	10K ohms 1/16W
R54	YF2116471JT	Carbon	470 ohms 1/16W
R55	YF2116821GT	Carbon	820 ohms 1/16W
R58	YF2116222GT	Carbon	2.2K ohms 1/16W
R59	YF2116103JT	Carbon	10K ohms 1/16W
R60,61	YF2116332JT	Carbon	3.3K ohms 1/16W
R62,63	YW2116105JT	Carbon	1M ohms 1/16W
R64	YF2116272JT	Carbon	2.7K ohms 1/16W
R65,66	YF2116102GT	Carbon	1K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R67	YF2116103JT	Carbon	10K ohms 1/16W
R68	YF2116561JT	Carbon	560 ohms 1/16W
R69	YF2116271JT	Carbon	270 ohms 1/16W
R70	YF2116561JT	Carbon	560 ohms 1/16W
R71	ERSB27J512	Metal	5.1K ohms
R72	YF2116122JT	Carbon	1.2K ohms 1/16W
R73	YF2116103JT	Carbon	10K ohms 1/16W
R74	YF2116222GT	Carbon	2.2K ohms 1/16W
R75,76	YF2116103JT	Carbon	10K ohms 1/16W
R77	YF2116562JT	Carbon	5.6K ohms 1/16W
R78	YF2116152JT	Carbon	1.5K ohms 1/16W
R79	YF2116472GT	Carbon	4.7K ohms 1/16W
R80	YF2116561JT	Carbon	560 ohms 1/16W
R81	YF2116751JT	Carbon	750 ohms 1/16W
R82	YF2116102GT	Carbon	1K ohms 1/16W
R83	YF2116103JT	Carbon	10K ohms 1/16W
R84	YF2116101JT	Carbon	100 ohms 1/16W
R85-88	YF2116152JT	Carbon	1.5K ohms 1/16W
R89	YF2116103JT	Carbon	10K ohms 1/16W
R90	YF2116471JT	Carbon	470 ohms 1/16W
R91,92	YF2116221JT	Carbon	220 ohms 1/16W
R93,94	YF2116102GT	Carbon	1K ohms 1/16W
R95	YF2116392JT	Carbon	3.9K ohms 1/16W
R96	YF2116122JT	Carbon	1.2K ohms 1/16W
R98,105	YF2116222GT	Carbon	2.2K ohms 1/16W
R106	YF2116223JT	Carbon	22K ohms 1/16W
R107	YF2116333GT	Carbon	33K ohms 1/16W
R108	YF2116153JT	Carbon	15K ohms 1/16W
R109	YF2116682JT	Carbon	6.8K ohms 1/16W
R110	YF2116102GT	Carbon	1K ohms 1/16W
R111	YF2116333GT	Carbon	33K ohms 1/16W
R112	YF2116154JT	Carbon	150K ohms 1/16W
R113	YF2116333GT	Carbon	33K ohms 1/16W
R114	YF2116223JT	Carbon	22K ohms 1/16W
R115	YF2116331JT	Carbon	330 ohms 1/16W
R116	YF2116222GT	Carbon	2.2K ohms 1/16W
R117	YF2116331JT	Carbon	330 ohms 1/16W
R118	YF2116101JT	Carbon	100 ohms 1/16W
R119	YF2116332JT	Carbon	3.3K ohms 1/16W
R120	YF2116102GT	Carbon	1K ohms 1/16W
R121	YF2116152JT	Carbon	1.5K ohms 1/16W
R122	YF2116562JT	Carbon	5.6K ohms 1/16W
R123	YF2116152JT	Carbon	1.5K ohms 1/16W
R124	YF2116562JT	Carbon	5.6K ohms 1/16W
R125	YF2116681JT	Carbon	680 ohms 1/16W
R126	YF2116101JT	Carbon	100 ohms 1/16W
R127	YF2116222GT	Carbon	2.2K ohms 1/16W
R128	YF2116103JT	Carbon	10K ohms 1/16W
R129,130	YF2116331JT	Carbon	330 ohms 1/16W
R131-135	YF2116103JT	Carbon	10K ohms 1/16W
R136-138	YF2116682JT	Carbon	6.8K ohms 1/16W
R139	YF2116332JT	Carbon	3.3K ohms 1/16W
R140	YF2116103JT	Carbon	10K ohms 1/16W
R141	R1220P123D	Metal	12K ohms
R142,143	YF2116104JT	Carbon	100K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION
R144,145	YF2116102GT	Carbon 1K ohms 1/16W
R146	YW2116182JT	Carbon 1.8K ohms 1/16W
R147	YF2116104JT	Carbon 100K ohms 1/16W
R148	YF2116272JT	Carbon 2.7K ohms 1/16W
R149	YF2116511JT	Carbon 510 ohms 1/16W
R150	YF2116272JT	Carbon 2.7K ohms 1/16W
R151	YF2116511JT	Carbon 510 ohms 1/16W
R152,153	YF2116152JT	Carbon 1.5K ohms 1/16W
R163	YF2116103JT	Carbon 10K ohms 1/16W
R164	YF2116222GT	Carbon 2.2K ohms 1/16W
R165	YF2116152JT	Carbon 1.5K ohms 1/16W
R166	YF2116222GT	Carbon 2.2K ohms 1/16W
R167	YF2116302GT	Carbon 3K ohms 1/16W
R168	YF2116103JT	Carbon 10K ohms 1/16W
R170	YF2116474JT	Carbon 470K ohms 1/16W
R171,200	YF2116184JT	Carbon 180K ohms 1/16W
R201	YF2116474JT	Carbon 470K ohms 1/16W
R202-205	YF2116103JT	Carbon 10K ohms 1/16W
R206	YF2116101JT	Carbon 100 ohms 1/16W
R207-209	YF2116104JT	Carbon 100K ohms 1/16W
R210	YF2116221JT	Carbon 220 ohms 1/16W
R211	YF2116561JT	Carbon 560 ohms 1/16W
R212	YF2116122JT	Carbon 1.2K ohms 1/16W
R213,214	YF2116221JT	Carbon 220 ohms 1/16W
R215	YF2116101JT	Carbon 100 ohms 1/16W
R216	YF2116103JT	Carbon 10K ohms 1/16W
R217	YF2116472GT	Carbon 4.7K ohms 1/16W
R218	YF2116102GT	Carbon 1K ohms 1/16W
R219	YF2116103JT	Carbon 10K ohms 1/16W
R220	YF2116104JT	Carbon 100K ohms 1/16W
R221	YF2116563JT	Carbon 56K ohms 1/16W
R222	YF2116683GT	Carbon 68K ohms 1/16W
R223	YF2116104JT	Carbon 100K ohms 1/16W
R224	YF2116101JT	Carbon 100 ohms 1/16W
R225	YF2116752JT	Carbon 7.5K ohms 1/16W
R226	YF2116331JT	Carbon 330 ohms 1/16W
R227	YF2116102GT	Carbon 1K ohms 1/16W
R228	YF2116332JT	Carbon 3.3K ohms 1/16W
VR3	EVML3GA00B53	Variable Resistor 5K ohms
VR4	EVML3GA00B24	Variable Resistor 20K ohms
VR5-8	EVML3GA00B23	Variable Resistor 2K ohms
VR9,10	EVML3GA00B53	Variable Resistor 5K ohms
VR11-14	EVML3GA00B23	Variable Resistor 2K ohms
VR15	EVML3GA00B53	Variable Resistor 5K ohms
VR18,19	EVML3GA00B23	Variable Resistor 2K ohms
VR20	EVML3GA00B52	Variable Resistor 500 ohms
VR22	EVML3GA00B23	Variable Resistor 2K ohms
VR23	EVML1GA00B53	Variable Resistor 5K ohms
VR24	EVML3GA00B15	Variable Resistor 100K ohms
VR25,26	EVML3GA00B53	Variable Resistor 5K ohms
VR27	EVML1GA00B23	Variable Resistor 2K ohms
VR28	EVML1GA00B13	Variable Resistor 1K ohms
VR30	EVML3GA00B53	Variable Resistor 5K ohms
C2,3	ECSF1AE106	Tantalum 10 µF 10V
C4	YF400104FZT	Ceramic 0.1 µF

REF.NO.	PART NO.	DESCRIPTION
C5	YF400471CHJT	Ceramic 470 pF
C6	YF400331CHJT	Ceramic 330 pF
C7,8	YF400100CHDT	Ceramic 10 pF
C15	ECEA1CKS470	Electrolytic 47 µF 16V
C16	ECEA0JKS330	Electrolytic 33 µF 6.3V
C17	YW426334FZT	Ceramic 0.033 µF
C18	ECEA0JKS330	Electrolytic 33 µF 6.3V
C19	ECEA1AKS470	Electrolytic 47 µF 10V
C20,21	ECEA1HSN010	Electrolytic 1 µF 50V
C22	ECEA1CKS100	Electrolytic 10 µF 16V
C23,24	ECEA1EK3R3	Electrolytic 3.3 µF 25V
C25	ECEA1CKS100	Electrolytic 10 µF 16V
C26	YF400104FZT	Ceramic 0.1 µF
C27	ECEA1CKS100	Electrolytic 10 µF 16V
C28,29	ECEA1EK3R3	Electrolytic 3.3 µF 25V
C30,31	ECEA1CKS100	Electrolytic 10 µF 16V
C32	ECEA0JKS330	Electrolytic 33 µF 6.3V
C33	ECEA1AKS330	Electrolytic 33 µF 10V
C34	YW426334FZT	Ceramic 0.033 µF
C35	ECEA1AKS330	Electrolytic 33 µF 10V
C36	ECST0JC226	Tantalum 22 µF 6.3V
C39	ECEA0JKS330	Electrolytic 33 µF 6.3V
C40,41	ECEA1HSN010	Electrolytic 1 µF 50V
C42	ECEA1CKS100	Electrolytic 10 µF 16V
C43,44	ECEA1EK3R3	Electrolytic 3.3 µF 25V
C45,46	ECEA1CKS100	Electrolytic 10 µF 16V
C47,48	ECEA1EK3R3	Electrolytic 3.3 µF 25V
C49,50	ECEA1CKS100	Electrolytic 10 µF 16V
C51	ECEA0JKS330	Electrolytic 33 µF 6.3V
C52	ECEA1AKS330	Electrolytic 33 µF 10V
C53	YW426334FZT	Ceramic 0.33 µF
C55	ECEA1AKS330	Electrolytic 33 µF 10V
C58	ECST1CC106ZR	Tantalum 10 µF 16V
C59	YF400103XKT	Ceramic 0.01 µF
C60	ECEA1CKN100	Electrolytic 10 µF 16V
C62	YF400101CHJT	Ceramic 100 pF
C63	ECEA1AKA101	Electrolytic 100 µF 10V
C72	ECEA1CKN100	Electrolytic 10 µF 16V
C75	YF400560CHJT	Ceramic 56 pF
C76	YF400050CHDT	Ceramic 5 pF
C77,78	ECST1AD476ZR	Tantalum 47 µF 10V
C79	ECEA1AKA101	Electrolytic 100 µF 10V
C80	ECEA1AKS470	Electrolytic 47 µF 10V
C81	ECEA1AKA101	Electrolytic 100 µF 10V
C82	ECEA1CKS470	Electrolytic 47 µF 16V
C83	ECST1AD476ZR	Tantalum 47 µF 10V
C84	YF400103XKT	Ceramic 0.01 µF
C85	ECST1AD476ZR	Tantalum 47 µF 10V
C86	YF400103XKT	Ceramic 0.01 µF
C87-89	YF400104FZT	Ceramic 0.1 µF
C90	ECEA1AKS330	Electrolytic 33 µF 10V
C91	YF400100CHDT	Ceramic 10 pF
C92	ECEA1AKK100	Electrolytic 10 µF 6.3V
C93-96	YF400104FZT	Ceramic 0.1 µF
C97,150	YF400103XKT	Ceramic 0.01 µF

REF.NO.	PART NO.	DESCRIPTION
C151	YF400271CHJT	Ceramic 270 pF
C152,153	YF400101CHJT	Ceramic 100 pF
C155,156	ECEA1CKS100	Electrolytic 10 µF 16V
C157,158	YF400100CHDT	Ceramic 10 pF
C160	YF400104FZT	Ceramic 0.1 µF
C161	ECEA1CKS100	Electrolytic 10 µF 10V
C162	YF400181CHJT	Ceramic 180 pF
C163-165	YF400104FZT	Ceramic 0.1 µF
CT1	YWCDX20APS	Trimmer Capacitor
L1	YWL5330J	Coil 33 µH
L2	YWLAL03NA4R7	Coil 4.7 µH
L4	YWL5330J	Coil 33 µH
L7,9	YWL5330J	Coil 33 µH
DL4	ELB4K118	Delay Line
DL5	ELB4K117	Delay Line
SW1	YWSSS222AN	Slide Switch
CF1,2	ELB4K055	Filter
CF3	ELB4K065	Filter
CN1	FCN215Q050G0	5-pin Connector
J1,3	YF21160R00T	Jumper Resistor
J5,7	YF21160R00T	Jumper Resistor
J100-103	YF21160R00T	Jumper Resistor
TP1-18	YW32BM5A	Test-pin

POWER/ALC BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB6 (NLA)	YWVKCF250P2A	Printed Circuit Board Assy
IC1-3	YWTL1451CNS	IC
IC4	NJM2902M	IC
IC5	YWUPC4062G2	IC
IC6,11	NJM2903M	IC
IC12	AN6701S	IC
IC401	YWUPC4062G2	IC
IC402	MN4053BS	IC
IC403	YWUPC4062G2	IC
IC404,405	MN4538BS	IC
IC406	MN4528BS	IC
Q1,2	2SD601-RS	Transistor
Q3	2SB709-RS	Transistor
Q4-9	2SD601-RS	Transistor
Q10,11	2SB709-RS	Transistor
Q12-15	2SD601-RS	Transistor
Q16	2SB709-RS	Transistor
Q17	2SJ132	Transistor
Q18	2SA1244Y	Transistor
Q19	2SD601-RS	Transistor
Q20	2SB709-RS	Transistor
Q21	2SA1244Y	Transistor
Q22	2SD601-RS	Transistor
Q23	2SC3074Y	Transistor
Q24	2SB766-RS	Transistor
Q25,26	2SD601-RS	Transistor
Q27	2SB709-RS	Transistor
Q28,29	2SJ132	Transistor
Q30	2SA1244Y	Transistor
Q31,32	2SD601-RS	Transistor
Q33	2SB709-RS	Transistor
Q34,35	2SJ128	Transistor
Q36	2SC3074Y	Transistor
Q37	2SB709-RS	Transistor
Q38	2SD601-RS	Transistor
Q39	2SB709-RS	Transistor
Q40	2SJ128	Transistor
Q42	2SC3074Y	Transistor
Q43	2SB709-RS	Transistor
Q46	2SJ132	Transistor
Q47	2SD601-RS	Transistor
Q48	2SK591	Transistor
Q49	2SJ132	Transistor
Q51	2SD601-RS	Transistor
Q401	2SB709-RS	Transistor
Q402	2SK198-P	Transistor
Q403-405	2SD601-RS	Transistor
Q406-408	2SB709-RS	Transistor
Q409	2SD601-RS	Transistor
Q410	2SB793-RS	Transistor
Q411	2SD601-RS	Transistor
Q412	2SB709-RS	Transistor
Q413,414	2SD601-RS	Transistor
Q415	2SK198-P	Transistor
Q416	2SD601-RS	Transistor
Q417	2SB709-RS	Transistor
Q418,419	2SD601-RS	Transistor
Q420	2SB709-RS	Transistor
D1	V03G	Diode
D2	MA1062-L	Diode
D3-5	YWERA81004	Diode
D6	MA151K	Diode
D7-9	YWERA81004	Diode
D403	MA151K	Diode
D404	MA151WA	Diode
D405-407	MA151K	Diode
R1	YF2116103JT	Carbon 10K ohms 1/16W
R2,3	YF2116104JT	Carbon 100K ohms 1/16W
R4	R1220P133D	Metal 13K ohms
R5	R1220P623D	Metal 62K ohms
R6	YF2116472GT	Carbon 4.7K ohms 1/16W
R7,8	YF2116103JT	Carbon 10K ohms 1/16W
R9	YF2116102GT	Carbon 1K ohms 1/16W
R10	YF2116393GT	Carbon 39K ohms 1/16W
R11	YF2116123JT	Carbon 12K ohms 1/16W
R12,13	YF2116393GT	Carbon 39K ohms 1/16W
R14	YF2116101JT	Carbon 100 ohms 1/16W
R15	YF2116392JT	Carbon 3.9K ohms 1/16W
R16	YF2116104JT	Carbon 100K ohms 1/16W
R17	YF2116471JT	Carbon 470 ohms 1/16W
R18	YF2116392JT	Carbon 3.9K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R19	YWR1220P823D	Metal	82K ohms
R20	YFR1220P104D	Metal	100K ohms
R21	YWR1220P753D	Metal	75K ohms
R22	YF2116154GT	Carbon	150K ohms 1/16W
R23	YF2116125JT	Carbon	1.2M ohms 1/16W
R24-26	YF2116393GT	Carbon	39K ohms 1/16W
R27	YF2116102GT	Carbon	1K ohms 1/16W
R28	YF2116562JT	Carbon	5.6K ohms 1/16W
R29	YF2116104JT	Carbon	100K ohms 1/16W
R30	YF2116102GT	Carbon	1K ohms 1/16W
R31	YF2116103JT	Carbon	10K ohms 1/16W
R32	YF2116823JT	Carbon	82K ohms 1/16W
R33	YF2116303GT	Carbon	30K ohms 1/16W
R34	YF2116512JT	Carbon	5.1K ohms 1/16W
R35	YF2116101JT	Carbon	100 ohms 1/16W
R36	YF2116392JT	Carbon	3.9K ohms 1/16W
R37	R1220P432D	Metal	4.3K ohms
R38	YWR1220P562D	Metal	5.6K ohms
R39	YF2116104JT	Carbon	100K ohms 1/16W
R40	YF2116103JT	Carbon	10K ohms 1/16W
R41	YF2116123JT	Carbon	12K ohms 1/16W
R42	YF2116682JT	Carbon	6.8K ohms 1/16W
R43	YF2116103JT	Carbon	10K ohms 1/16W
R44	YF2116823JT	Carbon	82K ohms 1/16W
R45	YF2116393GT	Carbon	39K ohms 1/16W
R46	YF2116512JT	Carbon	5.1K ohms 1/16W
R47	YF2116562JT	Carbon	5.6K ohms 1/16W
R48	YF2116104JT	Carbon	100K ohms 1/16W
R49,50	YF2116103JT	Carbon	10K ohms 1/16W
R51	YF2116562JT	Carbon	5.6K ohms 1/16W
R52	YF2116103JT	Carbon	10K ohms 1/16W
R53,54	YF2116100JT	Carbon	10 ohms 1/16W
R55	YWR1220P223D	Metal	22K ohms
R56	YWR1220P161D	Metal	160 ohms
R57	YWR1220P362D	Metal	3.6K ohms
R58	YF2116101JT	Carbon	100 ohms 1/16W
R59	YWR1220P223D	Metal	22K ohms
R60	YWR1220Q470D	Metal	47 ohms
R61	YFR1220P392D	Metal	3.9K ohms
R64	YF2116681JT	Carbon	680 ohms 1/16W
R65	YF2116332JT	Carbon	3.3K ohms 1/16W
R66	YF2116221JT	Carbon	220 ohms 1/16W
R67	YF2116332JT	Carbon	3.3K ohms 1/16W
R68	YF2116681JT	Carbon	680 ohms 1/16W
R69,70	YW2116182JT	Carbon	1.8K ohms 1/16W
R71	YF2116181JT	Carbon	180 ohms 1/16W
R72	YWR1220P333D	Metal	33K ohms
R73	YWR1220P122D	Metal	1.2K ohms
R74	YWR1220P332D	Metal	3.3K ohms
R75	YF2116471JT	Carbon	470 ohms 1/16W
R76	YWR1220P333D	Metal	33K ohms
R78	YWR1220P302D	Metal	3K ohms
R79	YF2116103JT	Carbon	10K ohms 1/16W
R80,81	YF2116100JT	Carbon	10 ohms 1/16W
R82	YWR1220P153D	Metal	15K ohms

REF.NO.	PART NO.	DESCRIPTION	
R84	YWR1220P512D	Metal	5.1K ohms
R88	YWR1220P153D	Metal	15K ohms
R89	YWR1220P561D	Metal	560 ohms
R90	YWR1220P512D	Metal	5.1K ohms
R91	YF2116103JT	Carbon	10K ohms 1/16W
R92,93	YF2116201JT	Carbon	200 ohms 1/16W
R94	YWR1220P183D	Metal	18K ohms
R95	YWR1220P103D	Metal	10K ohms
R96	YWR1220P122D	Metal	1.2K ohms
R97	YF2116101JT	Carbon	100 ohms 1/16W
R98	YWR1220P183D	Metal	18K ohms
R99	YWR1220P751D	Metal	750 ohms
R100	YWR1220P103D	Metal	10K ohms
R101	R1220P271D	Metal	270 ohms
R102	YF2116101JT	Carbon	100 ohms 1/16W
R103	YF2116103JT	Carbon	10K ohms 1/16W
R104	YF2116101JT	Carbon	100 ohms 1/16W
R106	YWR1220P163D	Metal	16K ohms
R107	YWR1220P622D	Metal	6.2K ohms
R108	YWR1220P221D	Metal	220 ohms
	YF2116301JT	Carbon	300 ohms 1/16W
R109	YF2116101JT	Carbon	100 ohms 1/16W
R110	YWR1220P183D	Metal	18K ohms
R111	R1220P681D	Metal	680 ohms
R112	YWR1220P622D	Metal	6.2K ohms
R124-126	YF2116104JT	Carbon	100K ohms 1/16W
R127	YF2116683GT	Carbon	68K ohms 1/16W
R129	YF2116100JT	Carbon	10 ohms 1/16W
R139	YF2116224JT	Carbon	220K ohms 1/16W
R140	YF2116393GT	Carbon	39K ohms 1/16W
R141	YF2116103JT	Carbon	10K ohms 1/16W
R142	YF2116106JT	Carbon	10M ohms 1/16W
R143	YF2116104JT	Carbon	100K ohms 1/16W
R145	YF2116103JT	Carbon	10K ohms 1/16W
R148	YWR1220P273D	Metal	27K ohms
R149	YWR1220P243D	Metal	24K ohms
R150	YF2116103JT	Carbon	10K ohms 1/16W
R401	YF2116102GT	Carbon	1K ohms 1/16W
R402	YF2116682JT	Carbon	6.8K ohms 1/16W
R403	YF2116102GT	Carbon	1K ohms 1/16W
R404	YF2116101JT	Carbon	100 ohms 1/16W
R405	YF2116223JT	Carbon	22K ohms 1/16W
R406	YF2116124GT	Carbon	120K ohms 1/16W
R407	R1220P822D	Metal	8.2K ohms
R408	YWR1220P302D	Metal	3K ohms
R410	YF2116152JT	Carbon	1.5K ohms 1/16W
R415	YF2116103JT	Carbon	10K ohms 1/16W
R416,417	YF2116333GT	Carbon	33K ohms 1/16W
R418,419	YF2116103JT	Carbon	10K ohms 1/16W
R422	YF2116622JT	Carbon	6.2K ohms 1/16W
R428	YF2116332JT	Carbon	3.3K ohms 1/16W
R430	YF2116223JT	Carbon	22K ohms 1/16W
R431	YF2116103JT	Carbon	10K ohms 1/16W
R432-434	YF2116473GT	Carbon	47K ohms 1/16W
R435	YF2116682JT	Carbon	6.8K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R436	YF2116333GT	Carbon	33K ohms 1/16W
R437,438	YF2116473GT	Carbon	47K ohms 1/16W
R439	YF2116102GT	Carbon	1K ohms 1/16W
R440	YF2116433GT	Carbon	43K ohms 1/16W
R441	YW2116242JT	Carbon	2.4K ohms 1/16W
R442	YF2116683GT	Carbon	68K ohms 1/16W
R443	YF2116473GT	Carbon	47K ohms 1/16W
R444	YF2116332JT	Carbon	3.3K ohms 1/16W
R445,446	YF2116102GT	Carbon	1K ohms 1/16W
R447	YF2116101JT	Carbon	100 ohms 1/16W
R448	YF2116472GT	Carbon	4.7K ohms 1/16W
R449	YF2116333GT	Carbon	33K ohms 1/16W
R450	YF2116101JT	Carbon	100 ohms 1/16W
R451	YF2116104JT	Carbon	100K ohms 1/16W
R452	YF2116332JT	Carbon	3.3K ohms 1/16W
R453	YF2116333GT	Carbon	33K ohms 1/16W
R454	YF2116682JT	Carbon	6.8K ohms 1/16W
R455	YF2116203JT	Carbon	20K ohms 1/16W
R456	YF2116103JT	Carbon	10K ohms 1/16W
R457	YF2116104JT	Carbon	100K ohms 1/16W
R458	YF2116223JT	Carbon	22K ohms 1/16W
R459	YF2116103JT	Carbon	10K ohms 1/16W
R460	YF2116152JT	Carbon	1.5K ohms 1/16W
R461,462	YF2116104JT	Carbon	100K ohms 1/16W
R463	YF2116473GT	Carbon	47K ohms 1/16W
R464	YF2116334JT	Carbon	330K ohms 1/16W
R465	YF2116272JT	Carbon	2.7K ohms 1/16W
R466,467	YW2116182JT	Carbon	1.8K ohms 1/16W
R468	YF2116272JT	Carbon	2.7K ohms 1/16W
R469	YF2116103JT	Carbon	10K ohms 1/16W
R470	YF2116473GT	Carbon	47K ohms 1/16W
R471,472	YF2116153JT	Carbon	15K ohms 1/16W
R473	YF2116303GT	Carbon	30K ohms 1/16W
R474	YF2116224JT	Carbon	220K ohms 1/16W
R475	YF2116823JT	Carbon	82K ohms 1/16W
R476	YF2116683GT	Carbon	68K ohms 1/16W
R477	YF2116243JT	Carbon	24K ohms 1/16WF
R480	YF2116101JT	Carbon	100 ohms 1/16W
R481	YF2116102GT	Carbon	1K ohms 1/16W
VR1	EVML3GA00B52	Variable Resistor	500 ohms
VR2	EVML3GA00B14	Variable Resistor	10K ohms
VR403	EVML3GA00B25	Variable Resistor	200K ohms
VR404	EVML3GA00B14	Variable Resistor	10K ohms
C1	ECEB1CS222	Electrolytic	2200 µF 16V
C2	ECSF1VE334	Tantalum	0.33 µF 35V
C3	YF400683XKT	Ceramic	0.068 µF
C4	ECSF1VE334	Tantalum	0.33 µF 35V
C5	YF400683XKT	Ceramic	0.068 µF
C6,7	YF400103XKT	Ceramic	0.01 µF
C8	ECSF1EE475	Tantalum	4.7 µF 25V
C9	YF400270CHJT	Ceramic	27 pF
C10	YF400683XKT	Ceramic	0.068 µF
C11	YF400103XKT	Ceramic	0.01 µF
C12	ECSF1EE475	Tantalum	4.7 µF 25V
C13	YF400683XKT	Ceramic	0.068 µF

REF.NO.	PART NO.	DESCRIPTION	
C14	YF400681CHJT	Ceramic	680 µF 50V
C15	ECSF1VE334	Tatalum	0.33 µF 35V
C16	YF400683XKT	Ceramic	0.068 µF XK
C17,18	ECA1CFZ221	Electrolytic	220 µF 16V
C19	ECA1CFZ151	Electrolytic	150 µF 16V
C20	YF400104FZT	Ceramic	0.1 µF
C21	ECA1AFQ221	Electrolytic	220 µF 10V
C22	ECA1EFZ820	Electrolytic	82 µF 25V
C23	ECEA1HKSR47	Electrolytic	0.47 µF 50V (KS)
C24	ECA1EFZ121	Electrolytic	120 µF 25V
C25	YF400103XKT	Ceramic	0.01 µF
C26	ECA1CFQ121	Electrolytic	120 µF 16V
C27	ECEA1HKSR47	Electrolytic	0.47 µF 50V (KS)
C28,29	ECA0JFZ331	Electrolytic	330 µF 6.3V
C30	YF400473FZT	Ceramic	0.047 µF
C31	ECA0JFQ471	Electrolytic	470 µF 6.3V
C33,34	ECA0JFZ331	Electrolytic	330 µF 6.3V
C35	ECEA1HKS0R1	Electrolytic	0.1 µF 50V
C36	YF400103XKT	Ceramic	0.01 µF
C37	ECA0JFQ471	Electrolytic	470 µF 6.3V
C38	ECA1CFZ221	Electrolytic	220 µF 16V
C39,40	ECA1AFZ221	Electrolytic	220 µF 10V
C41	ECEA1HKSR47	Electrolytic	0.47 µF 50V (KS)
C42	YF400103XKT	Ceramic	0.01 µF
C43	ECA1AFQ471	Electrolytic	470 µF 10V
C57	ECEA1HKSR47	Electrolytic	0.47 µF 50V (KS)
C58	ECEA1CKS100	Electrolytic	10 µF 16V
C60	ECEA1CKA330	Electrolytic	33 µF 16V
C62	YF400300CHJT	Ceramic	30 pF
C63,64	YF400104FZT	Ceramic	0.1 µF
C65	ECEA1CKS100	Electrolytic	10 µF 10V
C66,67	ECEA1EKS100	Electrolytic	10 µF 25V
C401	ECEA0JKS470	Electrolytic	47 µF 6.3V
C407	ECEA1ASN330	Electrolytic	33 µF 10V
C408	ECEA1AKA220	Electrolytic	22 µF 10V
C409	ECEA1CKS470	Electrolytic	47 µF 16V
C410	ECEA1CKA100	Electrolytic	10 µF 16V
C411	ECEA1EKA100	Electrolytic	10 µF 25V (KA)
C413	ECEA1CKS470	Electrolytic	47 µF 16V
C414	ECEA1AKS330	Electrolytic	33 µF 10V (KA)
C415,416	YF400103XKT	Ceramic	0.01 µF
C417,418	YF400104FZT	Ceramic	0.1 µF
C419	YF400473FZT	Ceramic	0.047 µF
C420	ECQM1H473JZ	Plastic	0.047 µF 50V
C421	YW400473XK	Ceramic	0.047 µF
C422,423	YW400102CHJT	Ceramic	1000 pF
L1	S100434470K	Coil	47 µH
L2	YWPF10221	Coil	22 µH
L3	YWPF8470K	Coil	47 µH
L4	S100434561K	Coil	560 µH
L5	S100434470K	Coil	47 µH
L6	S100434151K	Coil	150 µH
L7-9	S100434470K	Coil	47 µH
L10	S100434181K	Coil	180 µH
L11	S100434391K	Coil	390 µH

REF.NO.	PART NO.	DESCRIPTION	
SW1	YWCS422YTB	Rotary Switch	
SW2	YWCS412YTB	Rotary Switch	
CN1	FCN215Q050G0	5-pin Connector	
J83,151	YF21160R00T	Jumper Resistor	
J152,154	YF21160R00T	Jumper Resistor	
J409,414	YF21160R00T	Jumper Resistor	
E1-6	YW32BM5A	Terminal	
M77	YWV2HA0838A3	Shield Parts	

MOTHER BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB7 (NLA)	YWVKZF350E3A	Printed Circuit Board Assy	
IC1	NJU4053BM	IC	
IC2	NJU4052BM	IC	
IC3	MN4050BS	IC	
IC4	YWTC4S69F	IC	
IC5	NJU4053BM	IC	
IC6	YW78L05UATE2	IC	
IC7	NJM2903M	IC	
IC8	YWNJU4538BM	IC	
IC9	YWUPC4062G2	IC	
IC10,11	NJU4053BM	IC	
IC12	MN4070BS	IC	
IC14	MN4532BS	IC	
IC15	NJU4053BM	IC	
IC16	YWTC4S69F	IC	
Q1-3	2SD601-RS	Transistor	
Q4	2SB710-QRS	Transistor	
Q5	2SB709-RS	Transistor	
Q6	2SD601-RS	Transistor	
Q7	2SB709-RS	Transistor	
Q8-10	2SD601-RS	Transistor	
Q12	XN4401	Transistor	
Q13	2SD601-RS	Transistor	
D1	MA151K	Diode	
D2	MA4082M	Diode	
D3	LN11WP23	LED	
D4	MA4082M	Diode	
D5	MA151K	Diode	
D7	MA124	Diode	
D8-10	MA151K	Diode	
R1	YF2116472GT	Carbon	4.7K ohms 1/16W
R3	YF2116102GT	Carbon	1K ohms 1/16W
R4,5	YF2116103JT	Carbon	10K ohms 1/16W
R6,9	YF2116333GT	Carbon	33K ohms 1/16W
R10-12	YF2116333GT	Carbon	33K ohms 1/16W
R13-16	YF2116102GT	Carbon	1K ohms 1/16W
R17	YF2116104JT	Carbon	100K ohms 1/16W
R18	YF2116223JT	Carbon	22K ohms 1/16W
R19	YF2116474JT	Carbon	470K ohms 1/16W
R20	YF2116104JT	Carbon	100K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R21	YF2116154JT	Carbon	150K ohms 1/16W
R22	YF2116104JT	Carbon	100K ohms 1/16W
R23	YF2116103JT	Carbon	10K ohms 1/16W
R24	YF2116223JT	Carbon	22K ohms 1/16W
R25	YF2116102GT	Carbon	1K ohms 1/16W
R27	YF2116154JT	Carbon	150K ohms 1/16W
R28	YF2116104JT	Carbon	100K ohms 1/16W
R29	YF2116103JT	Carbon	10K ohms 1/16W
R30	YF2116223JT	Carbon	22K ohms 1/16W
R31	YF2116102GT	Carbon	1K ohms 1/16W
R33-35	YF2116473GT	Carbon	47K ohms 1/16W
R36	YF2116563JT	Carbon	56K ohms 1/16W
R37	YF2116103JT	Carbon	10K ohms 1/16W
R38	YF2116102GT	Carbon	1K ohms 1/16W
R41,42	YF2116101JT	Carbon	100 ohms 1/16W
R43	YF2116563JT	Carbon	56K ohms 1/16W
R44	YF2116223JT	Carbon	22K ohms 1/16W
R45	YF2116392JT	Carbon	3.9K ohms 1/16W
R46	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R47	ERJ8GCSG821	Carbon	820 ohms 1/8W
R48	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
R49	YF2116562JT	Carbon	5.6K ohms 1/16W
R50	YF2116563JT	Carbon	56K ohms 1/16W
R51	YF2116472GT	Carbon	4.7K ohms 1/16W
R52	YF2116102GT	Carbon	1K ohms 1/16W
R53,54	YF2116471JT	Carbon	470 ohms 1/16W
R55	YF2116104JT	Carbon	100K ohms 1/16W
R56,57	YF2116224JT	Carbon	220K ohms 1/16W
R59-61	YF2116333GT	Carbon	33K ohms 1/16W
R62	YF2116104JT	Carbon	100K ohms 1/16W
R63	YF2116472GT	Carbon	4.7K ohms 1/16W
R64	YF2116223JT	Carbon	22K ohms 1/16W
R65	YW2116105JT	Carbon	1M ohms 1/16W
R66,67	YF2116103JT	Carbon	10K ohms 1/16W
R68	YF2116104JT	Carbon	100K ohms 1/16W
R69	YF2116103JT	Carbon	10K ohms 1/16W
R70-72	YF2116104JT	Carbon	100K ohms 1/16W
R73-76	YF2116103JT	Carbon	10K ohms 1/16W
R77	YF2116273GT	Carbon	27K ohms 1/16W
R78	YF2116103JT	Carbon	10K ohms 1/16W
R79,80	YF2116472GT	Carbon	4.7K ohms 1/16W
R81,82	YF2116473GT	Carbon	47K ohms 1/16W
R83	YF2116472GT	Carbon	4.7K ohms 1/16W
R85	YF2116103JT	Carbon	10K ohms 1/16W
R86	YF2116104JT	Carbon	100K ohms 1/16W
R87	YF2116473GT	Carbon	47K ohms 1/16W
R88	YF2116104JT	Carbon	100K ohms 1/16W
R89	YF2116102GT	Carbon	1K ohms 1/16W
R90	YF2116474JT	Carbon	470K ohms 1/16W
R91	YF2116103JT	Carbon	10K ohms 1/16W
R92	YF2116104JT	Carbon	100K ohms 1/16W
R93	YF2116333GT	Carbon	33K ohms 1/16W
R96	YF2116102GT	Carbon	1K ohms 1/16W
R97-101	YF2116104JT	Carbon	100K ohms 1/16W
R102,104	YF2116101JT	Carbon	100 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION
R105	YF2116103JT	Carbon 10K ohms 1/16W
R106	YF2116473GT	Carbon 47K ohms 1/16W
R111	YF2116333GT	Carbon 33K ohms 1/16W
R112	YF2116472GT	Carbon 4.7K ohms 1/16W
R113	YF2116271JT	Carbon 270 ohms 1/16W
R117	YF2116101JT	Carbon 100 ohms 1/16W
R124	YF2116473GT	Carbon 47K ohms 1/16W
R125,126	YF2116103JT	Carbon 10K ohms 1/16W
R127	YF2116472GT	Carbon 4.7K ohms 1/16W
R128-130	YF2116473GT	Carbon 47K ohms 1/16W
R131	YF2116104JT	Carbon 100K ohms 1/16W
R132,133	YF2116473GT	Carbon 47K ohms 1/16W
R134-136	YF2116104JT	Carbon 100K ohms 1/16W
R137	YF2116333GT	Carbon 33K ohms 1/16W
R138	ERJ8GCSG391	Carbon 390 ohms 1/8W
R140	YF2116304JT	Carbon 300K ohms 1/16W
R146	YF2116682JT	Carbon 6.8K ohms 1/16W
VR1	PK502H103H0A	Variable Resistor 10K ohms
VR2,3	PK502H202H0A	Variable Resistor 2K ohms
VR4	PK502H202JH0	Variable Resistor 2K ohms
VR5,6	PK502H103H0A	Variable Resistor 10K ohms
VR7	EVML3GA00B13	Variable Resistor 1K ohms
VR8	EVML3GA00B54	Variable Resistor 50K ohms
C1	ECEA1CKS470	Electrolytic 47 µF 16V
C2	ECEA1AS470	Electrolytic 47 µF 10V
C3	YF400104FZT	Ceramic 0.1 µF
C4,5	YF400224FZT	Ceramic 0.22 µF
C6	YF400104FZT	Ceramic 0.1 µF
C7	ECEA1CKS470	Electrolytic 47 µF 16V
C8	ECEA1AKA101	Electrolytic 100 µF 10V
C9	ECEA1CKS470	Electrolytic 47 µF 16V
C10	YF400103XKT	Ceramic 0.01 µF
C11	YF400104FZT	Ceramic 0.1 µF
C12	ECST1AB106	Electrolytic 10 µF 10V
C13	YF400224FZT	Ceramic 0.22 µF
C15,16	YF400104FZT	Ceramic 0.1 µF
C17,18	ECEA1AKN470	Electrolytic 47 µF 10V
C19	ECEA1AKA101	Electrolytic 100 µF 10V
L1	YFLH10D500K	Coil 50 µH
SW1	YWSSSS922L4	Slide Switch
SW2	YWSS1015SPL	Slide Switch
SW3	YFSPH222A	Push Switch
SW4	YFSSS323L4	Slide Switch
SW5	YWSSSS922L4	Slide Switch
SW6	YFSSS323L4	Slide Switch
SW7,8	YWSSSS922L4	Slide Switch
SW9	YWSKHHBS	Push Switch
SW11	YWCS412YTB	Rotary Switch
CN1-4	FCN214J050G0	50-pin Connector
CN6	FCN235P068GE	68-pin Connector
CN7	EMCS0650ZL	6-pin Connector
CN8	EMCS0250ZL	2-pin Connector
CN11	YW69346013	26-pin Connector
CN12	YW69346011	22-pin Connector
CN101	EMCS1150Z	11-pin Connector

REF.NO.	PART NO.	DESCRIPTION
CN102	YWE111200000	11-pin Connector
CN103	YWE061200000	6-pin Connector
CN104	YWE081200000	8-pin Connector
CN105	YWE101200000	10-pin Connector
CN106	YWE131100000	13-pin Connector
CN107	YWE061200003	6-pin Connector
CN108	YWE051200003	5-pin Connector
CN109	YWE031200000	3-pin Connector
CN110	YWE041200000	4-pin Connector
CN111	YWE021200001	3-pin Connector
J1,3	YF21160R00T	Jumper Resistor
J6,7	YF21160R00T	Jumper Resistor
J9,11	YF21160R00T	Jumper Resistor
J40,107	YF21160R00T	Jumper Resistor
J119,141	YF21160R00T	Jumper Resistor
J145	YF21160R00T	Jumper Resistor
TP1-3	YW32BM5A	Test-pin
TP4,5	YW32BM4R5	Test-pin
TP6	YW32BM5A	Test-pin
M82	YWV3CA0176A4	Parts Holder

AUTO BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB8 (NLA)	YWVKYF350E2A	Printed Circuit Board Assy
IC1	YWD75112F570	Lsi
IC2	MN4051BS	IC
IC3	YWUPC4064G2	IC
IC4	MN4051BS	IC
IC5	NJM2902M	IC
IC6	MN4053BS	IC
IC7	NJM2901M	IC
IC8	UPD6142G-101	IC
IC9,10	YWM51957BL	IC
IC11	YWUPC4064G2	IC
IC12	YWTC4S11F	IC
IC13	BA226AF	IC
IC14	YWUPC4062G2	IC
IC15	YWRTC450315B	IC
IC16,17	YWTC4S69F	IC
IC18	MN4081BS	IC
Q2-4	2SD1819-QRS	Transistor
Q5-7	2SC3929-RS	Transistor
Q8-12	2SD1819-QRS	Transistor
Q14	2SB1218-QRS	Transistor
Q15,16	2SD1819-QRS	Transistor
Q17-19	2SC3931-CD	Transistor
Q20-23	2SD1819-QRS	Transistor
D1,2	MA141K	Diode
D3,4	MA143	Diode
D5	MA141WK	Diode
D6	MA141K	Diode
D7	MA141WK	Diode
D8	MA143	Diode

REF.NO.	PART NO.	DESCRIPTION	
R1	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R3,4	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R5-8	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R9	YWR1220P272D	Metal	2.7K ohms
R11	R1220P432D	Metal	4.3K ohms
R12	YWR1220P153D	Metal	15K ohms
R13,14	YFR1220P104D	Metal	100K ohms
R15,16	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R17,18	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R19	YWR1220P333D	Metal	33K ohms
R20	YWR1220P223D	Metal	22K ohms
R22	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R23	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R24	YWR1220P103D	Metal	10K ohms
R25	YWR1220P622D	Metal	6.2K ohms
R26,27	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R28	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R29	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R30	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R31,32	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R33	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R34	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R35	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R36	R1220P123D	Metal	12K ohms
R37	YFR1220P392D	Metal	3.9K ohms
R38-40	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R41-43	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R44,45	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R46,47	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R48,49	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R50-52	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R53	YFR1220P222D	Metal	2.2K ohms
R54	YWR1220P101D	Metal	100 ohms
R55	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R56	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R57	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R58	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R59	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R61	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R62	ERJ3GEYJ393	Carbon	39K ohms 1/16W
R63	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R64	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R65	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R66	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R67	R1220P432D	Metal	4.3K ohms
R68	R1220P123D	Metal	12K ohms
R69	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R71	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R72	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R73	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R74-78	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R79,80	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R81	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R82	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R83	ERJ3GEYJ274	Carbon	270K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R84	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R85	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R86	ERJ3GEYJ274	Carbon	270K ohms 1/16W
R87	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R89	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R90	R1220P133D	Metal	13K ohms
R91	YWR1220Q620D	Metal	62 ohms
R92	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R93	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R94	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R95	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R96,97	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R98-101	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R103	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R104-106	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R107	ERJ3GEYJ913	Carbon	91K ohms 1/16W
R108-110	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R111-114	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R115,116	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R117-119	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R120	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R121	YWR1220P362D	Metal	3.6K ohms
R122,123	YWR1220P391D	Metal	390 ohms
R124	YWR1220P302D	Metal	3K ohms
R125	R1220P151D	Metal	150 ohms
R128	R1220P123D	Metal	12K ohms
R129	YWR1220P682D	Metal	6.8K ohms
R130	ERJ3GEYJ393	Carbon	39K ohms 1/16W
R131	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R132	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R140,141	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R142-144	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R145	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R146	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R147	ERJ3GEYJ224	Carbon	220K ohms 1/16W
R148	ERJ3GEYJ683	Carbon	68K ohms 1/16W
R149	ERJ3GEYJ224	Carbon	220K ohms 1/16W
R150	ERJ3GEYJ683	Carbon	68K ohms 1/16W
R151-153	ERJ3GEYJ334	Carbon	330K 1/16W
R154	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R155-164	ERJ3GEYJ334	Carbon	330K ohms 1/16W
VR1,2	EVML3GA00B14	Variable Resistor	10K ohms
VR3,4	EVML3GA00B13	Variable Resistor	1K ohms
VR5	EVML3GA00B14	Variable Resistor	10K ohms
Z1	YWRKM10L503F	Block Resistor	
C1-4	YW5X103K2VB	Ceramic	0.01 µF
C5	ECEA0JS470	Electrolytic	47 µF 6.3V
C6,7	YW5CH330J5VB	Ceramic	33 pF
C8	ECEA1HSN010	Electrolytic	1 µF 50V
C9	ECST1AY335	Tantalum	3.3 µF 10V
C10	ECEA0JS470	Electrolytic	47 µF 6.3V
C11	ECEA1HSN010	Electrolytic	1 µF 50V
C12	ECST1AY335	Tantalum	3.3 µF 10V
C13,14	YF426104XKS	Ceramic	0.1 µF
C15,16	ECST1CY105ZR	Tantalum	1 µF 16V

REF.NO.	PART NO.	DESCRIPTION
C17	ECST1AD476ZR	Tantalum 47 µF 10V
C18	YW5UJ150J5VB	Ceramic 15 pF 50V(UJ)
C19	ECST1AD476ZR	Tantalum 47 µF 10V
C20	ECEA0JKA221	Electrolytic 220 µF 6.3V
C21	YW5X103K2VB	Ceramic 0.01 µF
C22,23	YW5F104Z2VB	Ceramic 0.1 µF
C24	YW5UJ120J5VB	Ceramic 12 pF 50V
C26	YW5F104Z2VB	Ceramic 0.1 µF
C27	ECST1CC106ZR	Tantalum 10 µF 16V
C28	YW5X102K5VB	Ceramic 1000 pF
C29	ECSF0JE686	Tantalum 68 µF 6.3V
C30	YW5F104Z2VB	Ceramic 0.1 µF
C31,32	YW5X103K2VB	Ceramic 0.01 µF
C33	ECST1AB106	Tantalum 10 µF 10V
C34-37	YW5F104Z2VB	Ceramic 0.1 µF
C56	YW5F104Z2VB	Ceramic 0.1 µF
C58	YW5CH330J5VB	Ceramic 33 pF
C60	YW5UJ681J5VB	Ceramic 680 pF 50V
C61-64	YW5X103K2VB	Ceramic 0.01 µF
C65,66	YW5X102K5VB	Ceramic 1000 pF
C67	ECST1AD476ZR	Tantalum 47 µF 10V
C68	ECST1CY105ZR	Tantalum 1 µF 16V
C69	ECST0JC226	Tantalum 22 µF 6.3V
C70	ECST1CY105ZR	Tantalum 1 µF 16V
C71	ECST0JC226	Tantalum 22 µF 6.3V
C72	ECST1CY105ZR	Tantalum 1 µF 16V
C73	ECST0JC226	Tantalum 22 µF 6.3V
C76-79	YW5F104Z2VB	Ceramic 0.1 µF
C80	ECST1AB106	Tantalum 10 µF 10V
CT1	ECRJA006A12W	Trimmer Capacitor 20 pF
L1	YWNL321R0M	Coil 1 µH
L2-4	YWNL32560K	Coil 56 µH
SW1	YWSKHHLN	Special Switch
X1	YWKBR4R19MS	Crystal Oscillator
CN11	YW68933226	26-pin Connector
CN12	YW68933222	22-pin Connector
J60,120	ERJ3GEY0R00	Jumper Resistor
J133,135	ERJ3GEY0R00	Jumper Resistor
J138,139	ERJ3GEY0R00	Jumper Resistor
TP1,2	YW32BM5A	Test-pin

REF.NO.	PART NO.	DESCRIPTION

SIDE SWITCH BOARD

PCB9 (NLA)	YWVKYF250E4A	Printed Circuit Board Assy
IC1	NJM2903M	IC
D1,2	MA153	Diode
R1,2	YF2116102GT	Carbon 1K ohms 1/16W
R3,4	YF2116333GT	Carbon 33K ohms 1/16W
R5	YF2116331JT	Carbon 330 ohms 1/16W
R6	YF2116223JT	Carbon 22K ohms 1/16W
R7	YF2116393GT	Carbon 39K ohms 1/16W
R8	YF2116333GT	Carbon 33K ohms 1/16W
R9,10	YF2116104JT	Carbon 100K ohms 1/16W
R11	YF2116333GT	Carbon 33K ohms 1/16W
R12	YF2116393GT	Carbon 39K ohms 1/16W
SW1-3	YWMEG7103G	Toggle Switch
SW4	YWMTKG7211G	Toggle Switch
M81	YWV2SA1631A3	Switch Mounting Angle

FRONT SWITCH BOARD

PCB10	YWVRZF250E4A	Printed Board
R1	ERDS2FJ101	Carbon 100 ohms 1/4W
SW1	YWMTKG7105G	Toggle Switch
SW2	YWMEG7103G	Toggle Switch
CN1	EMCS0250Z	2-pin Connector

BATTERY BOARD

PCB11	YWVRZF250E5A	Printed Board
R1	ERDS2TJ102	Carbon 1K ohms 1/4W
BAT	BR30321F2	Battery

FILTER SENSOR BOARD

PCB12	YWVRYF300P3A	Printed Board
VS1-3	YWNJL5146EA	Semiconductor
R1	YF2116222GT	Carbon 2.2K ohms 1/16W
R2	YF2116223JT	Carbon 22K ohms 1/16W
R3	YF2116473GT	Carbon 47K ohms 1/16W
R4	YF2116223JT	Carbon 22K ohms 1/16W
R5	YF2116473GT	Carbon 47K ohms 1/16W
R6	YF2116123JT	Carbon 12K ohms 1/16W
R7	YF2116273GT	Carbon 27K ohms 1/16W

REC SWITCH BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB13	YWVRZF70HE3A	Printed Board	
SW1	YWSKHGAA	Push Switch	

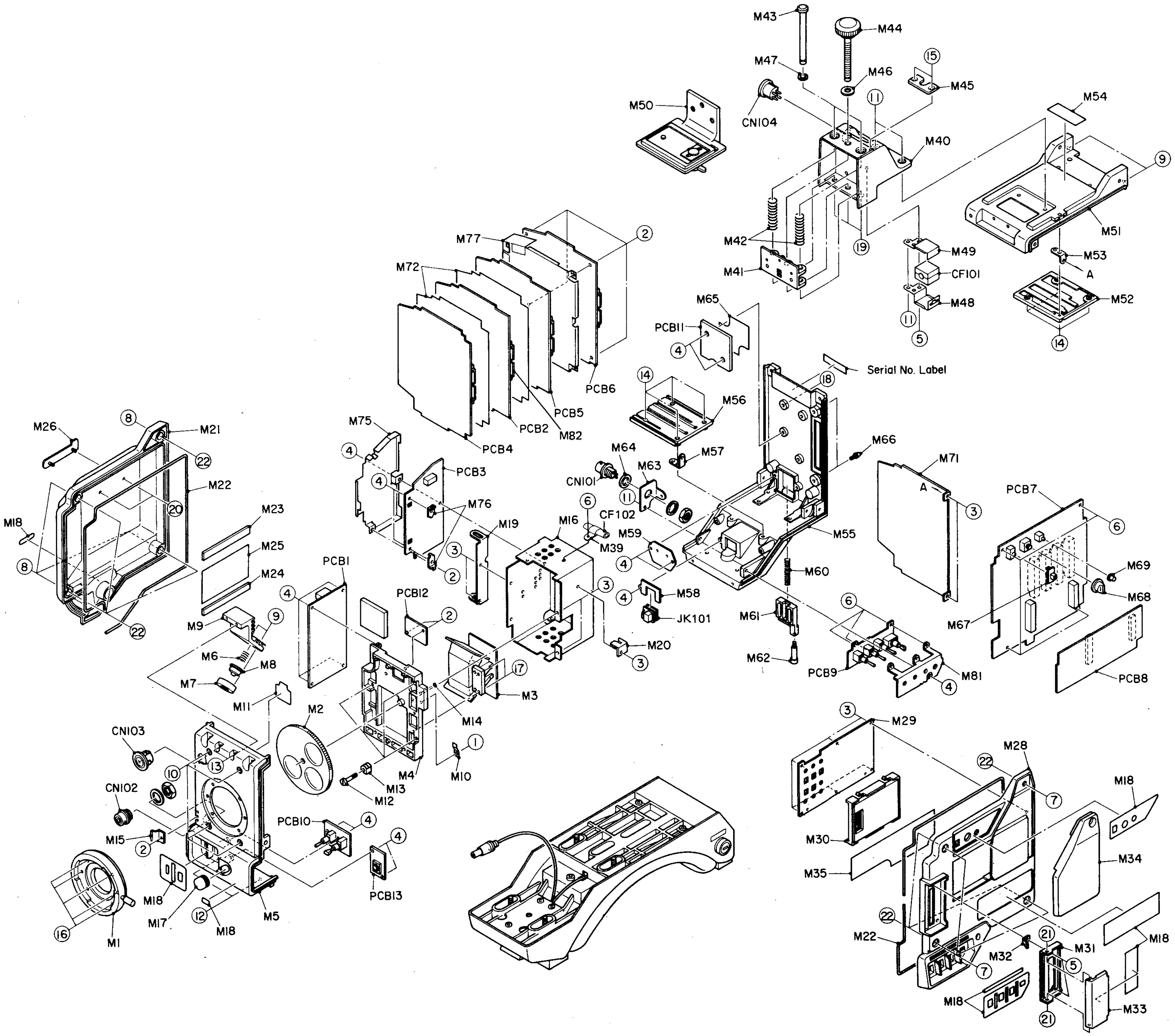
DRIVE SUB BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB14 (NLA)	YWVKCF350E3A	Printed Circuit Board Assy	
IC6	YWUPC4064G2	IC	
Q8	2SB793-RS	Transistor	
Q9	2SD601-RS	Transistor	
Q10	2SD973-QRS	Transistor	
Q11	2SB709-RS	Transistor	
Q12	2SB793-RS	Transistor	
Q13	2SD601-RS	Transistor	
Q15	2SB793-RS	Transistor	
Q16	2SD601-RS	Transistor	
R74	YF2116331JT	Carbon	330 ohms 1/16W
R75	YF2116102GT	Carbon	1K ohms 1/16W
R76	YWR1220P393D	Metal	39K ohms
R77	R1220P133D	Metal	13K ohms
R78	YWR1220P473D	Metal	47K ohms
R79	YWR1220P153D	Metal	15K ohms
R80	YF2116331JT	Carbon	330 ohms 1/16W
R81	YF2116102GT	Carbon	1K ohms 1/16W
R82	YWR1220P393D	Metal	39K ohms
R83	R1220P133D	Metal	13K ohms
R84	YWR1220P473D	Metal	47K ohms
R85	YWR1220P153D	Metal	15K ohms
R86	YF2116331JT	Carbon	330 ohms 1/16W
R87	YF2116102GT	Carbon	1K ohms 1/16W
R88	YWR1220P393D	Metal	39K ohms
R89	R1220P133D	Metal	13K ohms
R90	YWR1220P473D	Metal	47K ohms
R91	YWR1220P153D	Metal	15K ohms
R95	YF2116331JT	Carbon	330 ohms 1/16W
R96	YF2116102GT	Carbon	1K ohms 1/16W
R97	YWR1220P393D	Metal	39K ohms
R98	R1220P133D	Metal	13K ohms
R99	YWR1220P473D	Metal	47K ohms
R100	YWR1220P153D	Metal	15K ohms
C32	ECEA1ES221	Electrolytic	220 µF 25V(SU)
C33	ECEA1EU470	Electrolytic	47 µF 25V(SU)
C34	ECEA0JK220	Electrolytic	22 µF 6.3V
C35	ECEA1CKS470	Electrolytic	47 µF 16V
C36	ECEA1CKA101	Electrolytic	100 µF 16V
C37	ECEA0JK220	Electrolytic	22 µF 6.3V
C38	ECEA1CKA101	Electrolytic	100 µF 16V
C39	ECEA1AKA101	Electrolytic	100 µF 10V
C40	ECEA0GKK220	Electrolytic	22 µF 4V
C41	ECEA1AKA101	Electrolytic	100 µF 10V
C43,44	ECEA1CKA101	Electrolytic	100 µF 16V
C45	ECEA0JK220	Electrolytic	22 µF 6.3V
CN5	YW530201210	12-pin Connector	

ACCESSORY PARTS/PACKAGING PARTS

REF.NO.	PART NO.	DESCRIPTION
CN110	YWPLUG-3	Plug
M91	YWV8QA2274AN	Operating Instructions
M92	YWV8RA0233A4	Printed Matters
M93	YWV8RA0266AN	Printed Matters
M94	XZB55X71C1	Polyethylene Bag
M95	YWV9CA1516BN	Packaging Assy
M96	YWT10X16C03	Polyethylene Bag for MIC
M97	YWT20X25C03	Polyethylene Bag for EVF
M98	XZB26X40C05	Polyethylene Bag for Tripod Mounting

EXPLODED VIEW OF COLOUR VIDEO CAMERA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M44
M47
M46
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M45
M50
CN104
11
M40
M54
9
M51
M77
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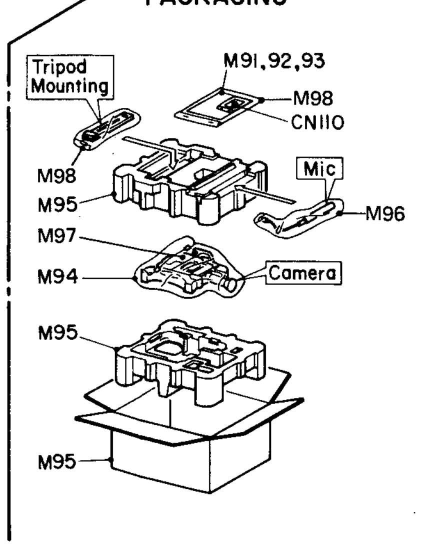
M72
M42
M41
19
M49
CF101
M48
11
5
M53
A
M52
14
M65
PCB11
4
Serial No. Label
18
PCB6
14
M56
PCB5
PCB2
M82
PCB4
M75
4
PCB3
M64
M57
M66
M71
A
3
PCB7
6
M63
CN101
11
4
M76
6
CF102
M39
M19
M16
M59
4
M55
M69
M68
M60
M26
8
M21
22
M22
20
M23
M18
M25
M24
8
22
3
2
PCB1
3
PCB12
2
M58
4
JK101
M61
6
M67
M9
9
M6
M8
M7
M11
17
M3
M20
3
M62
PCB9
4
M81
PCB8
M14
M2
CN103
13
10
CN102
M15
2
M4
M13
M12
1
M10
PCB10
4
4
PCB13
M18
M17
12
M18
M5
16
M1
3
M29
M28
22
7
M18
M30
M34
M35
22
M22
21
M31
M32
5
7
M18
M33
21
M18

○ Numbers show screws.

No.	Screws	Description
1	XSB2 + 3FX	Binding Head Screws
2	XSB2 + 4FX	Binding Head Screws
3	XSB26 + 4FX	Binding Head Screws
4	XSB26 + 6FX	Binding Head Screws
5	XSB26 + 6FX	Binding Head Screws
6	XSB3 + 6FX	Binding Head Screws
7	XSB4 + 8FN	Binding Head Screws
8	XSB4 + 12FN	Binding Head Screws
9	XSB2 + 6FXK	Binding Head Black Screws
10	XSB26 + 8FXK	Binding Head Black Screws
11	XSB3 + 6FXK	Binding Head Black Screws
12	XSB3 + 8FXK	Binding Head Black Screws
13	XSB3 + 10FXK	Binding Head Black Screws
14	XSS26 + 8FX	Flush Head Machine Screws
15	XSS3 + 6FN	Flush Head Machine Screws
16	XSN3 + 6FN	Pan Head Machine Screws
17	XYN3 + C8FX	Machine Screw and Washer Ass'y
18	XVE3B6FX	Hexagon Head Bolts
19	JE-3	Washer C
20	XNG2EFX	Hexagon Head Nuts
21	XPJ16C6V	Spring Pin
23	P3	Ring

PACKAGING


Tripod Mounting
M91,92,93
M98
CN110
M98
M95
Mic
M96
M97
M94
Camera
M95
M95